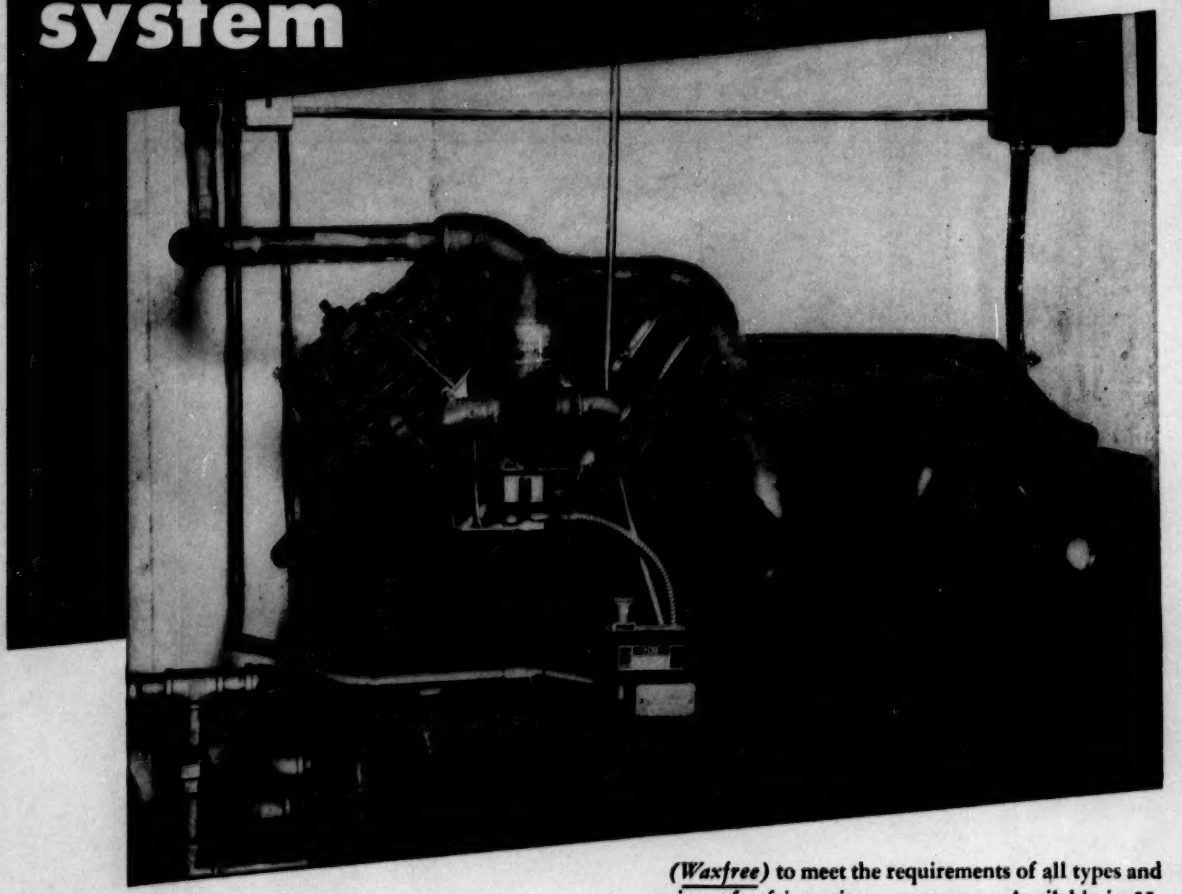
INDUSTRIAL REFRIGERATION

How to keep wax OUT of a refrigerating system



USE the oil that *won't precipitate wax* in systems even at temperatures of minus 100°F. — *Texaco Capella Oil (Waxfree)*. You'll assure smooth, clean, trouble-free performance—and get top efficiency.

Texaco Capella Oil (Waxfree) has outstandingly low haze and floc temperatures, remarkable stability and resistance to oxidation. In addition, it does not foam and is compatible with all refrigerants.

There is a complete line of *Texaco Capella Oils (Waxfree)* to meet the requirements of all types and sizes of refrigerating compressors. Available in 55-gallon and 5-gallon drums, 1-gallon cans—and the most widely used grades in 1-quart containers. All are *refinery-sealed* to protect original purity and quality.

Let a Texaco Lubrication Engineer help you get highest efficiency from your compressors. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Capella Oils (Waxfree)

FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

TUNE IN . . . TEXACO STAR THEATER starring DONALD O'CONNOR or JIMMY DURANTE on television . . . Saturday nights, NBC.

VESTIBULE TYPE TRACK DOOR

YEARS OF SATISFACTION

"Butcher Boy"

Quality Since 1885

WHY "BUTCHER BOY" DOORS ARE THE FINEST REFRIGERATOR DOORS BUILT!

These Exclusive Features Furnished At No Extra Cost

DOOR STRUCTURE

HARDWARE

APPEARANCE

When a Man Thinks Twice ...He Makes Comparisons

BUTCHER BOY REFRIGERATOR DOOR CO. HARVARD ILLINOIS

STAND-OUT

Freezing To Live

MORE and more patients these days are getting cold treatment from doctors, being almost frozen, to live, says a recent issue of Science News Letter. Some of them are small children born with defective hearts that need "blue baby" and other kinds of operations to mend them. Others are grown-ups with tumors, called aneurysms, of blood vessels.

The patients do not feel chilled. They are put gently to sleep before the cold is turned on. They do not awaken until they are warm again. While they are having their frosty nap, surgeons have time to perform intricate operations that are practically bloodless, even when the operations are done on veins and arteries and the heart itself.

The time factor is the big gain from this cold treatment. When a surgeon cuts into a large blood vessel or the heart he must stop the blood flow temporarily. But blood carries oxygen. And body tissues cannot live long without oxygen. Some can take oxygen lack for longer periods than others. But for vital organs such as the brain, liver and kidneys, the crucial period is measured in minutes.

One way of sparing tissues from suffocation is to reduce their demand for oxygen. Years ago anesthetists recognized, in a backhanded way, that reducing body temperature would reduce oxygen demand. What they recognized first was really the reverse of this. A patient brought to the operating room for an emergency appendix operation did poorly under the anesthetic if he was feverish. This was because the need for oxygen is increased seven percent for every degree Fahrenheit rise in body temperature. A patient with a temperature of 101.6 degrees Fahrenheit would need a 20 percent increase in oxygen. Such patients could not get by on the oxygen in the air of the room. So anesthetists faced with such patients would turn on the oxygen tank to give extra oxygen to the patient. Air conditioning for operating rooms helped when it came along. So did ice packs.

The limit to which patients have been chilled has been about 75 degrees Fahrenheit. Below this, complex chemical changes occur which may become irreversible. Theoretically, if patients could safely be cooled to about 53 or 54 degrees Fahrenheit, their body tissues would make no demands for oxygen. The 75-degree limit, however, has enabled many life-saving operations to be performed.

Refrigerating patients, inducing hypothermia (low temperature, doctors call it) can be done by many methods. One is a rubber mattress through which ice water is circulated and on which the patient goes to sleep. European scientists run blood from an artery through a plastic tube packed in ice and back to a vein. Another method is to run sterile cold salt water into the patient's chest, then warm him up by running sterile warm salt water into the chest cavity.

Industrial Refrigeration

formerly ICE AND REFRIGERATION

Now in its 64th Year of Publication

J. F. NICKERSON, FOUNDER

Vol. 129 | July, 1955 | Number 1

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The Cover:

Processes that unlock chemicals from coal, air and water call for extreme pressures and temperatures. This picture at DuPont's Belle works, shows ammonia compressor units in the background, and chilled water pumps forward which use a fourth of the plant's steam output. For additional comments on processes and production of chemical products see page 41.

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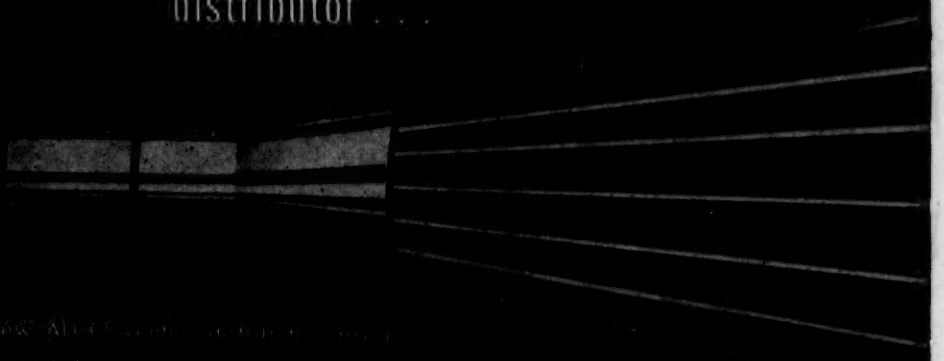
AT LAST! what the industry has been waiting for!

ALCO'S NEW

Venturi-Flo
distributor . . .



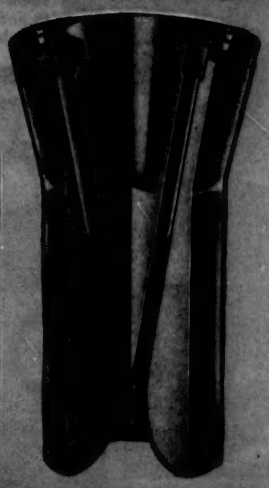
works in any position
vertical, upside-down or horizontal.

wide application range
from 25% of capacity to 150% of rated capacity . . . with only a small pressure drop at maximum conditions.

low-pressure drop
allows closer and more economical thermo-valve sizing.

one-piece construction
no nozzles for capacity regulation . . . nothing to take apart, nothing to come apart.

engineered—for service for life



ALCO

ALCO VALVE CO.

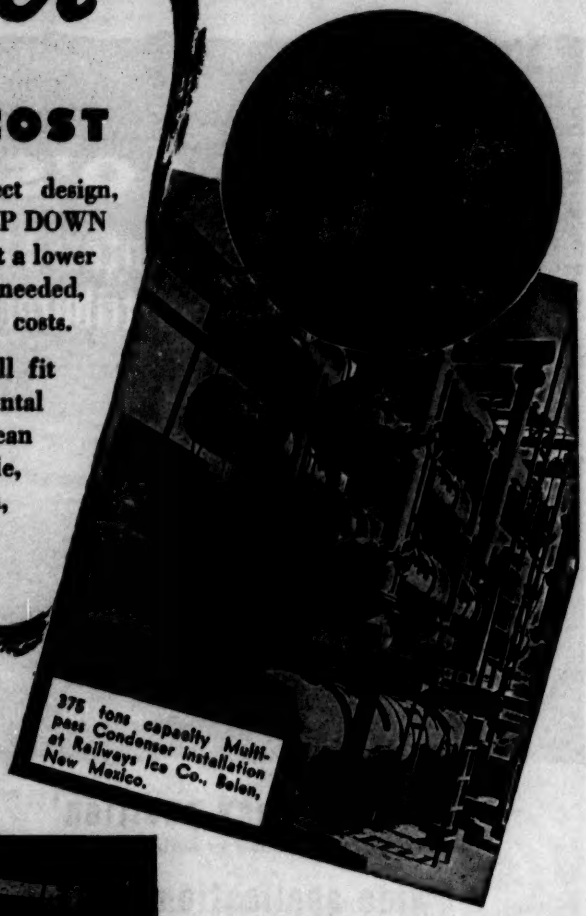
$ave Power and REFRIGERATION COST

Vogt Condensers, because of their correct design, STEP UP the rate of heat transfer and STEP DOWN head pressures. With the liquid delivered at a lower temperature, smaller compressor capacity is needed, saving in original as well as operating costs.

One of the two basic types illustrated will fit your operations exactly. Install Horizontal Multipass (closed type) for use with clean waters. Where the water is hard, forms scale, contains mud or promotes fungus growth, Vertical Single Pass (film type) which can be cleaned in operation, are recommended.

Horizontal Multipass Condensers
(Closed Type)

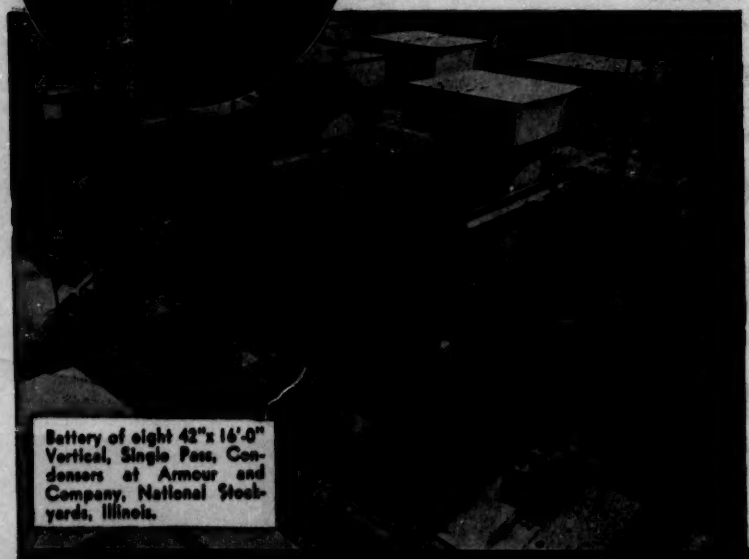
Water circulated in tubes traverses the length of the unit a number of times as determined by baffles in the heads.



375 tons capacity Multipass Condenser installation at Railways Ice Co., Belen, New Mexico.

Vertical Single Pass Condensers
(Film Type)

Patented ferrules give equal distribution of water to and over the surfaces of all tubes in a unit.



Battery of eight 42"x 16'-0" Vertical, Single Pass, Condensers at Armour and Company, National Stockyards, Illinois.

HORIZONTAL and VERTICAL TYPES SHELL and TUBE CONDENSERS For Every Service

Write For Bulletin RC-2

HENRY VOGT MACHINE COMPANY
INCORPORATED
1000 W. ORMSBY ST., LOUISVILLE 10, KY., U.S.A.
Branch Offices: NEW YORK, CHICAGO, CLEVELAND, DALLAS, PHILADELPHIA, ST. LOUIS, CHARLESTON, W. VA.

Vogt REFRIGERATION CONDENSERS

What's New

MACHINERY
APPLIANCES • PROCESSES

Electrically Operated Cold Storage Doors

DEVELOPMENT of an electrically operated cold storage door was announced by Clark Door Company, Newark, N. J., through exhibits at the Frozen Food Convention in March, and Refrigerated Warehousemen's Convention in April. This latest addition to the company's line of doors operates on the same mechanical principal as its "Prest-O-Matic" Industrial Doors, with the addition of insulated door sections and special features suitable to cold storage requirements.

"Prest-O-Matic" cold storage doors are manufactured in two basic models. One is a freezer door to meet conditions down to minus 50 F. These units are equipped with electric de-icing cables to eliminate icing at all points of contact. The other model, reported under "What's New", April 1955, INDUSTRIAL REFRIGERATION, is for cooler or industrial applications where materials must be kept in sub-normal temperatures.

Cork, "Fiberglas", "Foamglas", or"Styrofoam" insulation in thicknesses dependent upon specific conditions is used in the door sections. Special rubber gaskets assure tight closure, and safe operation is assured by means of a sensitive safety edge which automatically reverses the doors upon striking an obstruction in the doorway.

Because the doors open or close in from two to four seconds, in average-size openings, the time required for traffic to pass through doorways can be reduced up to 75 percent. This results in less open-door time and consequent reduction in refrigeration loss.

The cooler and freezer doors are manufactured as complete package units including motor operator, frame, insulated door sections, all hardware and approach pull cord switches. They must be installed by the purchaser's own mechanics.

Plastic Lead Seal Pipe Thread Compound

A NEW Plastic Lead Seal polyvinyl tube is offered by the Crane Packing Co., Chicago, which, it is claimed, provides an easy and convenient method for applying the compound to threaded connections and other surfaces to eliminate waste or mess. Tube is made from tough

polyvinyl plastic that will not crack at the seams or separate at the bottom crimp. According to the manufacturer, it will withstand constant squeezing and will not split or damage under the impact of falling blunt tools or similar objects. It also can be dropped from "ladder" height with little danger of breakage.

A friction-type cap provides a positive seal, yet affords an easy means of uncapping and capping. It cannot become unscrewed, thus eliminating leakage due to this common occurrence. In this tube form, Plastic Lead Seal conveniently fits into serviceman's tool box or provides an answer for easier packaging in service kits. Tube end is designed to provide an applicator for applying proper amount of compound.

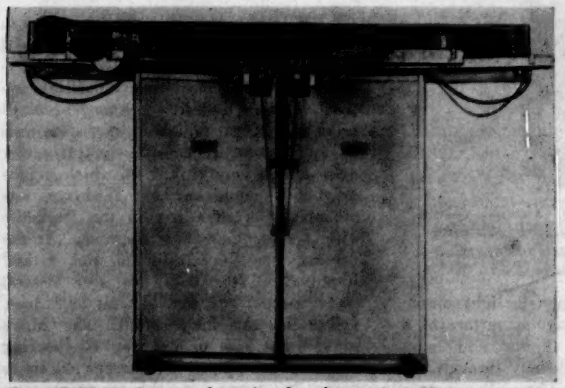
Plastic Lead Seal pipe thread compound is Underwriters' approved. It provides a permanent, leakproof seal under a wide variety of applications and service conditions, yet is non-hardening, thus permitting easy disassembly of connections, even after years of service. It withstands pressures up to 6000 psi., temperatures to 600 F. and is insoluble in water, steam, gas, refrigerants, many chemicals and all petroleum products.

Tripod Vise Stand

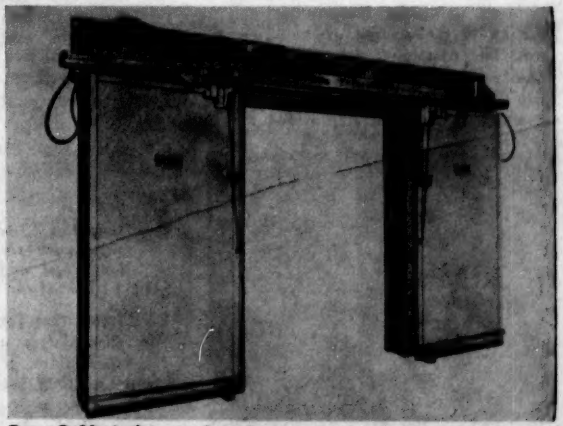
THE new Pipemaster Tripod Vise Stand was designed by Erie Tool Works to adjust automatically on pipe from ⅛ to 2½ inches, and to clamp on it with *less than one turn of the screw.* Another ex-

New Pipemaster Tripod Vise Stand

clusive feature is the 3-way, long tool-steel top jaw with milled teeth that gives triple jaw life. The bottom jaws, which are also long tool-steel, are reversible. The vise stand has a large hinged shelf that insures rigidity in use and provides space for many tools.



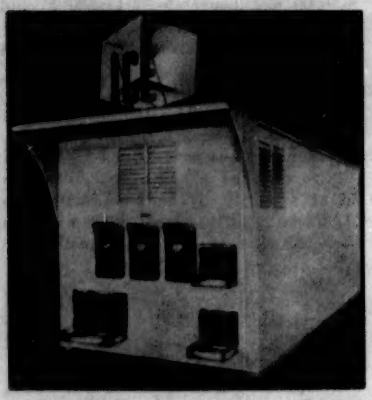
Prest-O-Matic freezer door in closed position. Note emergency release cables for hand operation in event of power failure. Insulation thickness up to 8 inches. Electric de-icing cables are installed in the doors.



Prest-O-Matic freezer door in open position. Doors ride up and outwardly to open, down and inwardly to close. Safety edge reverse doors automatically if closing upon an obstruction.

New Polar Ice Vendor

A NEW Model C-3 Polar Ice Vendor, for the ice industry has been designed by the Refrigeration Engineering Company, Montgomery, Minn. This new vendor is shipped completely assembled and wired, ready to operate. After placing on location it is only necessary to lead electric current to the switch boxes and open the valves.



The new model C-3 Polar Ice Vendor

The cabinet of heavy gauge embossed aluminum exterior is painted white, with hardware in bright chrome, is 8 x 20 x 8 ft. and weighs approximately 9000 pounds. Refrigeration is supplied by a 2 hp compressor with Bush automatic electric defrost system. Belt capacities are 54—10 pound bags; 54—25 pound blocks or 36—50 pound blocks; 55—25 pound bags; with ample storage within station. An ice cube sign with flashing light and attractive cut-out "ICE" letters is furnished. The coin mechanism takes change in nickels, dimes or quarters, rejecting slugs and foreign coins.

Air Conditioned Cabinet For Testing Materials

A COMPLETELY air conditioned test cabinet to provide full control of relative humidity and temperature for testing materials, products or specimens is announced by Niagara Blower Co. The method used is that of saturating air at the required dew-point temperature and reheating to the desired dry-bulb temperature. The control of relative humidity to close tolerances is given in the range of 5 to 95 percent. The dry-bulb temperature at which this control is provided will depend on the collateral services afforded. With simply water and electric power the top of the range is approximately 150 F and the low limit depends on available water temperature.

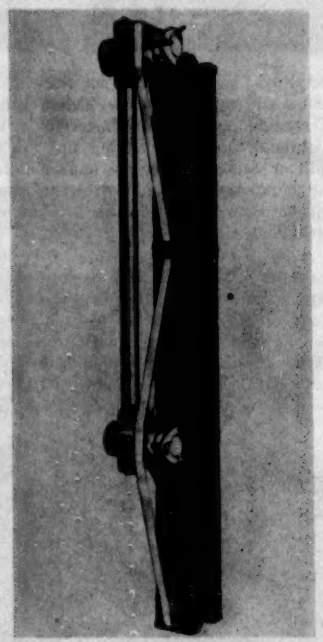
Niagara Blower Air Conditioned Test Cabinet

When refrigeration is provided, Niagara "No Frost" liquid may be used in the spray water and the dew point temperature may be taken as low as minus 30 F with a corresponding lowering of the dry-bulb temperature at which low humidities can be produced. No moisture-sensitive instruments are required to achieve and hold the control and recording instruments may be used.

The test cabinet dimensions are 30 by 28 by 24 inches clear opening for access to 26 by 22 inches. The air conditioning unit is fully accessible, located in an insulated cabinet. There is also a window for viewing the test material adjoining the test cabinet. Both cabinets are insulated.

Liquid Level Illuminator Introduced by Jerguson

NEW efficiency is given to liquid level gage lighting with the newly redesigned and improved Gage Illuminators announced by Jerguson Gage & Valve Co., Somerville, Mass. These illuminators give an even diffusion of light over the entire length of the gage glass, with no glare spots or blinding areas, thus enabling the engineer to see the liquid level easily and clearly under all conditions.

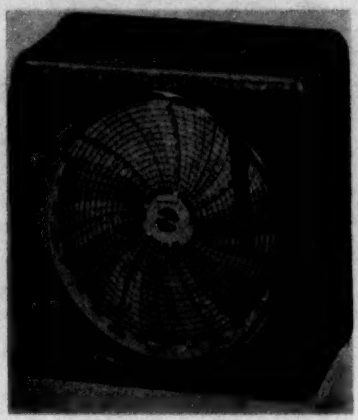


Jerguson 3-section liquid level gage with single-section illuminator (top) and 2-section illuminator (bottom).

Illumination from a single light source is reflected from the angular surface of a ¾ inch thick plastic wedge and flows with evenly diffused intensity through the transparent gage glass. These illuminators are available also in explosion-proof models, approved by Underwriters' Laboratories for use in hazardous locations for Class 1, Group D Services. Standard models operate on 110-120 volts AC or DC. Complete information including catalog material is available.

Temperature Recorder For Trucks and Rail Cars

A TEMPERATURE recording instrument has been designed by The Dickson Company, Chicago, to furnish a dependable continuous written record of the temperatures inside a truck or rail car. In sturdy case, measuring 5¼ inches square and 2 inches deep, the instrument records temperatures ranging from minus 20 F. to 120 F.



New Temperature recording instrument of Dickens Company

Producers and carriers of meat, dairy products, sugar products, yeast, biologicals, and other perishables have tested the new instrument. They report that it not only helps determine the exact condition of a shipment on arrival, but is also paving the way to reduced shipping costs in several instances.

Various types of Dickson Minicorder Instruments have been in general industrial use for a number of years. Technically, the special feature of the new Minicorder instrument is its built-in ability to report the facts accurately under road conditions.

Haskelite Slam Tests Doors

ORIGINAL equipment manufacturers in the refrigerator door and sectional refrigerator fields, and cold storage warehouses, dairies, and other industries employing heavy walk-in doors may be interested in a recent report on door slam tests of a Hasko-Struct door. A typical cooler door 3 ft. 6 in. x 6 ft. 6 in. which weighs only 36½ pounds without hardware, was set up for a slam test in the Haskelite Mfg. Co.'s engineering laboratory. At the present time, according to this Grand Rapids firm, the door has over 800,000 slams without any sign of wear or failure, except in the hinge itself. The hinge shows some sign of wear on the bearing surface. Based upon an average 40 times a day, 365 days a year, this represents over 55 years of door slamming. (For description of this new product, see INDUSTRIAL REFRIGERATION, April 1955, Page 7).

FOAMGLAS®

the cellular, stay-dry insulation

Underground quarry's 2,500-carload freezers stay dry because FOAMGLAS is moisture-proof

In a nine-acre *underground* limestone quarry below a 175 ft. overburden, Inland Cold Storage Company, Kansas City, Kansas, can store 2,500 carloads of frozen foods! "Our cave was a natural for this," Inland President Leonard H. Strauss points out. "A year-round temperature of 55°F cut in half our costs for refrigeration and construction. With naturally insulated ceilings and floors, only walls were needed to complete our 16 storage rooms.

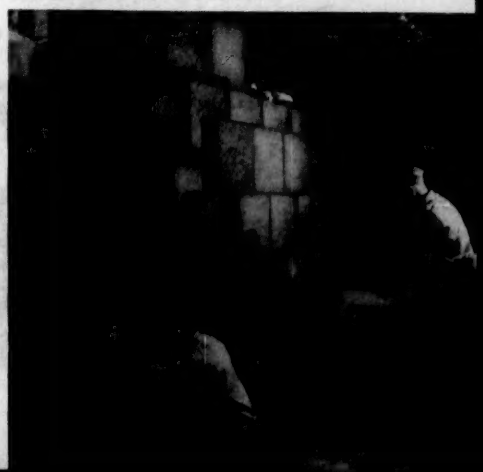
"We had one tough problem. Although this is a 'dry cave,' on a hot, humid day the relative humidity inside the undeveloped area may reach 85%. But this moist air won't get into any of our freezers or coolers because their walls are insulated with moisture-proof FOAMGLAS. It's the one insulation that'll stay constantly efficient, making refrigeration failure a minor problem. We'd lose only two or three degrees in our zero degree rooms with a complete refrigeration breakdown for two weeks."

You can benefit too from the unique properties of this waterproof, strong, vermin-proof insulation. Please write today for our booklets with complete technical and specification data for cold storage insulation.

Pittsburgh Corning Corporation

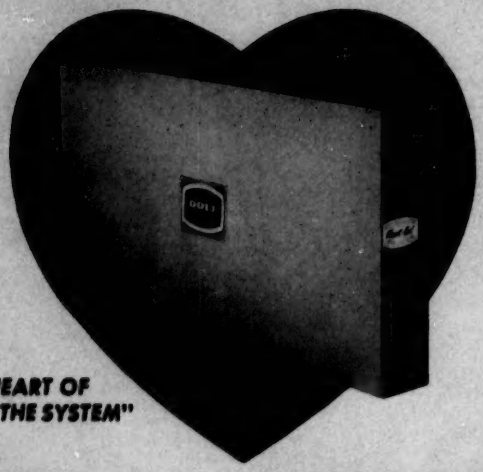
Department 9, One Gateway Center
Pittsburgh 22, Pennsylania
In Canada: 57 Bloor St. W., Toronto, Ontario

450,000 bd. ft. of FOAMGLAS was very easy to install... five inches thick on walls between the rooms and six inches, double coursed on perimeter walls. 15,000 ft. of FOAMGLAS pipe insulation was applied later to brine lines held at 24° below zero. General Contractor was Winn-Senter Construction Co., Kansas City, Mo.; Insulation Contractor was Kelly Asbestos Products Co., Kansas City, Mo.



DEFROST PROBLEMS?
Here's the ANSWER!...

ELECTRIC
Heat-Cel



"HEART OF THE SYSTEM"

Automatic DEFROST
FOR NEW OR EXISTING INSTALLATIONS

- Heat for re-evaporation supplied by low wattage, long life ELECTRIC HEATER.
- Positive, consistent, economical.
- Performs efficiently in any ambient, regardless of location or season.
- Independent of compressor operating time or type (air or water cooled).
- Solution temperature automatically maintained by thermostat.
- Adjustable for individual operating conditions.
- No special controls needed for winter-time operation.
- Higher wattage elements available for extreme conditions.
- Heater replaceable in the field.
- Patented DOLE VACUUM principle insures faster heat transfer for quicker defrosting . . . convenient "plate" design allows flat-against-wall mounting.

Write for Engineering Catalog DE.

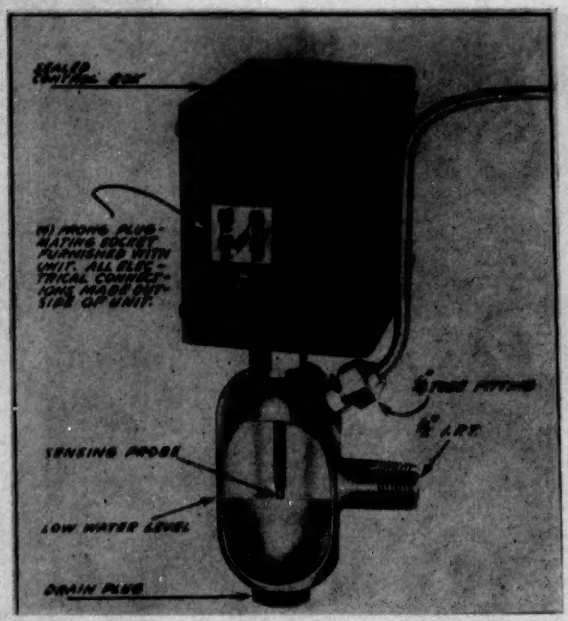
Defrosting "Kit" includes Heat-Cel and Accessory Package containing all necessary controls*

* Approved by Underwriters Laboratories

Dole Refrigerating Company

Floatless Level Control with Sealed Control Box

RELEASE of its floatless type level control unit which is an adaptation of probe type level control units applied to industrial equipment is announced by the Techniflex Corp., Port Jervis, N.Y. The standardized design or domestic and medium size commercial installations provide an economical, and easily installed unit with a power requirement of 110 vac. By means of a transformer contained within the sealed control box all signal voltages are reduced for the complete elimination of any electrical hazard.


SEALED CONTROL BOX
(4) PRONG PLUG-MATING SOCKET FURNISHED WITH UNIT. ALL ELECTRICAL CONNECTIONS MADE OUTSIDE OF UNIT.
SENSING PROBE
LOW WATER LEVEL
DRAIN PLUG

New Multiple purpose low water cut-off alarm and control system.

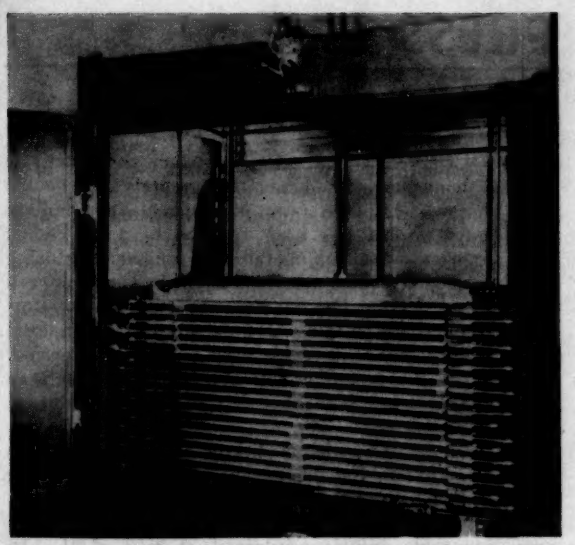
The electrical hookup is safe and simple through the use of a four prong plug and socket arrangement furnished with the unit. The vessel containing the probe is marked externally to show the low water level. As long as the tip of the sensing probe is immersed in water no action is called for. However when the water level falls below the probe tip then control and/or alarm action is called in via the relay contained in the sealed control box. As an additional precaution the unit is designed to act in a fail safe manner. Where a controlled level range is required and the difference between high-low levels does not exceed 6 inches, two probes are furnished in one vessel.

Contact-Type Package Freezer For Packaged Food Products

A CONTACT-TYPE package freezer, known as the "Articold", is being introduced by the Canning Machinery Division, Food Machinery & Chemical Corp., San Jose, Calif., exclusive sales agent.

The Articold, according to the sales agent, is designed to freeze packaged food products quickly, evenly, and at low costs. It will handle both consumer and institutional size cartons at rates up to 1280 lbs of fruits and vegetables an hour, or, 1800 lbs of meat and fish an hour, including handling time. The quick-freeze principle is employed by the machine, with minus 35 F refrigerant.

The machine is designed to provide eight to twenty freezing stations formed by a series of horizontal freezing plates in which a refrigerant is evaporated or circulated. Trays of processed packaged foods are placed onto these plates which are then hydraulically lowered to a predetermined setting, allowing the bottoms of the plates to make contact with the tops of the cartons directly underneath (See illustration). The contact of the plates against both the bottom and top of the cartons, assures quick even freez-

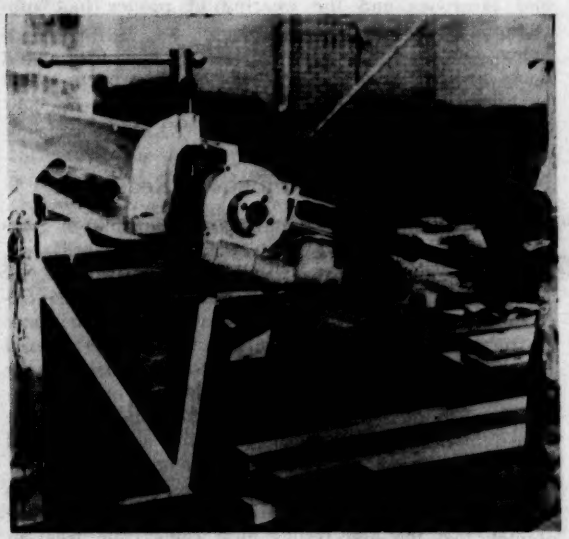


The contact-type package freezer designed for freezing packaged food products.

ing of the packaged product, and also assures a flat, uniform package for maximum casing efficiency. It is approximately 8 ft. wide x 5 ft. deep x 11 ft. high. It is portable and can be used at the packing line or on the loading dock, or transferred from plant to plant to meet seasonal requirements.

Portable Pipe Threader A Versatile Tool

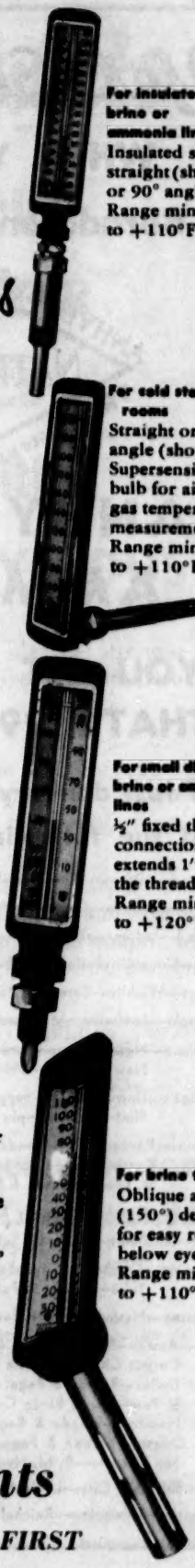
QUICK and easy pipe threading on the job is now possible through the new Lawco Junior Portable Power Pipe Threader available from Velocity Power Tool Company, 201 North Braddock Avenue, Pittsburgh. Simple adapters and a speed reducer make it possible to handle pipe from ¼-inch up to 10 inches.



The Junior Portable Power Pipe Threader made by Velocity Power Tool Company.

Since the threader weighs only 20 pounds and is only 27 inches in length, it is easily carried to where the threading is to be done. Likewise, it is designed and constructed for one hand operation. To operate, apply the threading dies to the tool, position the tool, then press a button and the power unit drives the cutting dies. It is equipped with a ¾-hp electric motor and a toggle switch to provide reversible power.

Taylor Industrial Thermometers are Accurate Rugged and 3 times Easier to Read!



For insulated brine or ammonia lines
Insulated stem, straight (shown) or 90° angle. Range minus 40° to +110°F.

For cold storage rooms
Straight or 90° angle (shown). Supersensitive bulb for air and gas temperature measurement. Range minus 40° to +110°F.

For small diameter brine or ammonia lines
½" fixed thread connection. Stem extends 1" below the thread. Range minus 20° to +120°F.

For brine tanks
Oblique angle (150°) designed for easy reading below eye level. Range minus 40° to +110°F.

There's a Taylor Thermometer for practically every temperature measuring problem. Ask your Taylor Field Engineer, or write for **Catalog 300.**

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Kentucky—Louisville—Merchants Chem. Co., Inc.

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New Orleans—Whitman-Holloway-Oliver

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San Antonio—R. M. Hughes & Co.

Utah—Salt Lake City—Louis A. Roser Co.

Wisconsin—Milwaukee—Reichel-Korfmann Co.

PRESS BRIEFS

Safety Program Reduces Accidents

THROUGH an active safety program conducted by the management and on the property of Pacific Fruit Express Co., the ratio of accidents per million man hours worked has been reduced to 3.11. Pacific Fruit Express owns and operates 16 ice manufacturing plants located at strategic stations on the rails of Southern Pacific and Union Pacific Railroad Companies, storing, shipping and placing in refrigerator cars a total of over 1,060,600 tons of ice over a 12 month period. At four of these stations mechanical icing machines are used requiring fast movement of ice from storage to the machines.

The ice is sometimes handled three different times from the brine tunkers of cars, thus presenting an accident hazard at each handling. PFE plants worked a total of 2,347,108 man hours in 1954, with only nine reportable injuries sustained at two of the 16 points, leaving the 14 remaining plants with accident free records for the year.

In addition to the manufacturing and dispensing of vast tonnage of ice, many of these perishable icing stations are located at points where low temperatures are encountered. Therefore shipm-ents require heater protection during winter months, involving handling of over 200,000 heaters in and out of the bunkers of cars. At times the cars in these trains are serviced under very adverse weather conditions.

To cope with these hazards the men are schooled and trained in the handling of heaters, and the dispensing and reclaiming of methanol alcohol each year prior to the heater season. In the handling of ice the men are taught the proper use of tools; tongs, bars and picaroons and the wearing of proper foot protection. To handle this volume of ice necessitates it being moved out of storage rooms and over icing decks by the use of chains, belts and conveyors which at times have a solid ribbon of ice over a 24-hour period.

New Trawler Will Do Fishery Research

THE first diesel electric trawler to be built in Scotland, the fishery research trawler, Sir William Hardy, has been completed by Hall, Russell and Co. Ltd., of Aberdeen and will be handed over shortly to the Department of Scientific and Industrial Research to whose instructions she has been built. The trawler was ordered by the Director of Navy Contracts on behalf of the D.S.I.R. and is designed for research work on preservation of fish at sea. She will operate from the Torry Research Station, Aberdeen and will allow practical experiments at sea on preservation methods.

The Torry Station has been working for many years on this question of preservation and has held to the opinion that the best results must come from freezing as early as possible after catching. Preliminary work was done insofar as facilities allowed on existing craft, and equipment devised which provided satisfactory prospects for economic handling. The construction of a special research trawler was discussed and then deferred for economy reasons, but ultimately approval was obtained. The Sir William Hardy has specially insulated fish rooms, one of which is equipped with quick freezing plant.

Minute Maid Sues Clinton Foods

A SUIT has been filed by Minute Maid Corp., against Clinton Foods Corp., for $1,160,000, claiming that some assets it took over when it bought Clinton's Snow Crop division last November were not "as represented and warranted" by Clinton.

In an action filed in U.S. District Court for the Southern District of New York, Minute Maid alleges the Snow Crop inventories included approximately 400,000 cases of frozen concentrated orange juice "and quantities of other frozen juices and foods" which were unmarketable. Minute Maid is asking for $1 million in damages on this ground.

The suit also alleges Minute Maid paid $250,000 for Snow Crop frozen food cabinets that were actually worth only $90,000. Of 8,500 cabinets included in the sale contract, many "were not in existence, and only a few were in good condition," the complaint states. Minute Maid seeks $160,000 damages on this score. Clinton Foods was required to answer the suit by June 23.

Minute Maid bought Snow Crop's inventories and fixed assets last year for $39.8 million, which represented book value less a discount of $5.2 million. The transaction made Minute Maid the second biggest company in the frozen food business, according to President John M. Fox.

Mark Candee, vice president of Clinton Foods, commented: "The suit involves the determination of book value of various assets, and the assets involved in the litigation are a very small portion of the assets involved in the transfer of the Snow Crop business to Minute Maid. We do not agree with the interpretation and claims of Minute Maid, and intend to fully present our defense and counterclaims within the time required by Federal rules."

Decrease in CCC Purchases

DURING the 1954-55 marketing year, butter purchases by the Commodity Credit Corporation were down 45 percent from the previous year, cheese purchases were down 65 percent, and non fat milk purchases were down 21 percent, the U. S. Dept. of Agriculture reports.

During the same twelve month period, the movement out of CCC inventories exceeded by more than three times the out movement during the previous twelve month period (April, 1953 to March, 1954.) For the period March, 1954 to March, 1955, this has resulted in a decrease of 35 percent in CCC butter holdings, a decrease of 30 percent in cheese holdings, and a decrease of 85 percent in non fat dry milk holdings. Stocks on hand at the end of March this year were butter 2,360,219 lbs, cheese 328,588,000 lbs and non fat dry milk solids 86,345,000 lbs.

Fire Destroys Frozen Citrus Warehouse

A NEW half-million dollar refrigerated warehouse at Bradenton, Fla., was razed by fire June 15 at the plant of Fruit Industries, Inc., a big producer of frozen citrus juice. Completion of the new building was celebrated June 12. It was to have been put into use the day it burned. The company produces Tropicana Brand orange, grapefruit and lime juice.

Fisheries Plant Expands

AN EXTENSION expansion of its new plant at Petit de Graf, Nova Scotia, has been completed by Booth Fisheries. It will make possible the processing of 2,000,000 pounds of fish weekly, it was announced by Robert P. Fletcher, Jr., president of the firm.

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ICE
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TEMPLETS make ice clearer, stronger and faster! They also give ice an attractive sparkle and polish.

TEMPLETS have been used by leading ice manufacturers throughout the country for almost a quarter of a century.

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Once you've tried TEMPLETS you'll like them.

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In the Spotlight

FOREIGN cold storage operators have taken to the trend of one-story construction. On page 15 is a descriptive article of a new warehouse in Israel. Other features are similar to construction and engineering in the United States; except, that where manufacturers and plants here have shown tendency to multi-cylinder reciprocating compressors, this installation chose relatively medium speed single cylinder vertical compound acting units. The insulation and concrete construction is also of unusual design.

A PROBLEM in the operation of cold storage doors for low temperature service has been their tendency to freeze shut. How freezing takes place between the gasket and the door frame and the causes and means of preventing this condition are discussed in the article starting on page 19.

THE MAINTENANCE of wiper gaskets on bottom of freezer doors is a problem in the refrigerated warehousing industry. How this problem was met by an enterprising engineer of a California warehouse is told in the article on page 24.

ICE BAGS for fishermen help to sell more ice and cut down on pilferage of company ice bags, according to The Royal Palm Ice Company of Florida. For details, see story on page 18.

THE ICE CONVENTION will be held November 15-18 at Los Angeles and already plans are being made. Reasons why it should draw a good attendance of ice men are outlined in a publicity release of the National Association of Ice Industries, summarized on page 28.

THE SAFETY RECORD of the warehousing industry is very poor, according to statistics of the National Safety Council, which should offer an incentive to warehouse managers to do something about it. The situation is explained, with information on how to carry on safety work, with a Safety Committee in article starting on page 23.

THE EXPANSION of the frozen food industry, which created the need for increased refrigerated storage has brought mutual problems to both industries, which has formed the subject of numerous joint conferences. At the most recent such conference, concepts of what the packer and the warehousemen expect were offered in an address by one of the leading packers. His remarks are briefed in the article on page 26.

MODERNIZATION of equipment and expansion of operations has resulted in more profitable operation for a Florida ice company. Controls were added to the engine room equipment and changes were made to help streamline retail sales, which have been very satisfactory. For full story and pictures see page 22.

BROKEN EGGS furnished to bakers, hotels and restaurants is a specialty of the Watertown Egg Company, Milwaukee, Wisc. Quality control is maintained by homogenizing and refrigeration and standardized method of storing. For picture and description of process see page 27.

MARKET LOSSES, according to the U.S. Dept. of Agriculture are a fourth of the value of lettuce, onions, peppers, strawberries; a fifth for sweet potatoes, celery, tomatoes.

FEATURE of this month's NAPRE section is the first of two articles on basic electric controls and understanding of their wiring diagrams. Industrial refrigeration has advanced from the manual operating age, through the age of semi-automation, to the threshold of complete automation of plants. With it has come increased responsibility for the competent practical refrigeration engineer. The NAPRE feature on page 30 will serve as a "refresher" for the experienced men, the basic instruction for the apprentice.

LETTERS

(Letters to the editor are welcome from readers of INDUSTRIAL REFRIGERATION on any subject of general interest.)

Convention Report "Tops"

Cleveland, Ohio

I HAVE been reading my copy of INDUSTRIAL REFRIGERATION for the month of May and wish to compliment you on your report of the American Warehousemen's Association Convention in Chicago, together with that of the National Association of Refrigerated Warehouses Division, and also the 11th Annual Meeting of the Refrigeration Research Foundation. I think that your report is complete, yet concise, and really gives wonderful coverage of several meetings. Congratulations on another job well done.

A. B. EFROYMSON, President
National Terminals Corp

Soldier Wants to Be Back on "Cold Front"

Fort Eustis, Va.

I've received all of the magazines (*Industrial Refrigeration*) since going into the service and it keeps me in touch with the industry. I have read with much interest "Refrigeration in the Dairy Industry" and also the article about the use of Refrigerants in the May issue. Of course the Question and Answer department is topmost in interest to me and the Practical Refrigerating Engineer is next. Keep up the good work and I'm looking forward to being back soon on the "Cold Front".

JOHN PONDISH
Member-at-Large, NAPRE

FAST FACTS ABOUT genetron Super-Dry Refrigerants

"Genetron" *Super-Dry* Refrigerants are made by General Chemical Division, Allied Chemical & Dye Corporation, one of America's great producers of industrial and scientific chemicals for more than 50 years. Long a leader in fluorine chemistry, General has the mines, resources, reserves, experience and production facilities that make it a reliable source of fluorinated hydrocarbon refrigerants.

Careful control in the manufacture of "Genetron" refrigerants guarantees products of the highest quality, extremely low in moisture and other impurities. "Genetron" Refrigerants are identical and interchangeable in all respects with comparable fluorinated hydrocarbon refrigerants produced by any other manufacturer meeting the same high quality refrigerant standards and specifications. They have been tested exhaustively by major manufacturers and are being used in their air conditioning and refrigeration equipment.

- **Guaranteed: Exceptionally low moisture content**
- **Non-corrosive to standard equipment materials**
- **Non-toxic, non-flammable, stable, safe**
- **Critical and freezing points well outside range of operating uses**
- **Solvent action on oil helps prevent solidification or congealing of lubricant**
- **Miscible with oil; aid in lubrication of equipment**

genetron 11 ORANGE LABEL — **Trichloromonofluoromethane**

genetron 12 WHITE LABEL — **Dichlorodifluoromethane**

genetron 141 GREEN LABEL — **Monochlorodifluoromethane**

Selected Physical Data

	CCl_3F	CCl_2F_2	$CHClF_2$
Chemical Formula			
Molecular Weight	137.4	120.9	86.5
Boiling Pt. (°F) at 1 Atmosphere Pressure	74.7	−21.6	−41.4
Evaporator Pressure at 5°F (p.s.i. absolute)	2.93	26.52	43.02
Condensing Pressure at 86°F (p.s.i. absolute)	18.3	108.0	174.5
Freezing Point (°F) at 1 Atmosphere Pressure	−168.0	−247.0	−256.0
Critical Temperature (°F)	388.4	232.7	204.8
Critical Pressure (p.s.i. absolute)	635	582	716
*Compressor Discharge Temperature (°F)	113	102	131
Compression Ratio (86°F/5°F)	6.24	4.08	4.06
Liquid Viscosity at 5°F (centipoises)	0.650	0.328	0.286
Liquid Viscosity at 86°F (centipoises)	0.405	0.251	0.229
Vapor Viscosity at 1 atm. and 5°F (centipoises)	0.0096	0.0114	0.0114
Vapor Viscosity at 1 atm. and 86°F (centipoises)	0.0111	0.0127	0.0131
Saturated Liquid Density at 5°F (lbs./cu. ft.)	97.88	90.00	83.34
Saturated Liquid Density at 86°F (lbs./cu. ft.)	91.38	80.63	73.36
Saturated Vapor Density at 5°F (lbs./cu. ft.)	0.0815	0.6735	0.8034
Saturated Vapor Density at 86°F (lbs./cu. ft.)	0.4461	2.569	3.213
Specific Volume of Vapor at 5°F (cu. ft./lb.)	12.27	1.485	1.246
Latent Heat of Vaporization at 5°F (B.t.u./lb.)	84.0	69.5	93.5
Net Refrigeration Effect of Liquid 86°F/5°F (B.t.u./lb.)	67.5	51.1	69.3
Specific Heat of Liquid at 86°F (B.t.u./lb. °F)	0.209	0.243	0.335
Specific Heat of Vapor at Constant Pressure of 1 atm. and 86°F (B.t.u./lb. °F)	0.13	0.14	0.15
Specific Heat Ratio at 86°F at 1 atm. (k = Cp/Cv)	1.14	1.14	1.18
*Coefficient of Performance	5.00	4.69	4.65
*Horsepower/Ton Refrigeration	0.943	1.005	1.016
*Refrigerant Circulated/Ton Refrig. (lbs./min.)	2.96	3.91	2.89
*Liquid Circulated/Ton Refrig. (cu.in./min.)	56.0	83.8	68.1
*Compressor Displacement/Ton Refrig. (c.f.m.)	36.3	5.81	3.60
Thermal Conductivity of Liquid at 86°F (B.t.u./hr./sq.ft./°F/ft.)	0.0609	0.0492	0.0595
Thermal Conductivity of Liquid at 32°F (B.t.u./hr./sq.ft./°F/ft.)	0.0680	0.0559	0.0704
Thermal Conductivity of Vapor at 86°F (B.t.u./hr./sq.ft./°F/ft.)	0.0048	0.0056	0.0068
Thermal Conductivity of Vapor at 32°F (B.t.u./hr./sq.ft./°F/ft.)	0.0045	0.0048	0.0060
Toxicity (Underwriters' Laboratories Group No.)	5	6	5A
Flammability & Explosivity	none	none	none
Relative Dielectric Strength of Vapor (compared with Ethyl Chloride as Unity)	3.00	2.40	1.31
Odor	Ethereal	Ethereal	Ethereal
Type of Compressor in Which Usually Used	Rotary & Centrifugal	Reciprocating & Rotary	Reciprocating
Evaporator Temperature Range	30 to 50°F	0 to 50°F	−130°F to 0°F
Solubility of Water in Liquid Refrigerant at 32°F (gm./100 gm. Refrigerant)	0.0036	0.0026	0.060
Solubility of Water in Liquid Refrigerant at 86°F (gm./100 gm. Refrigerant)	0.013	0.012	0.15
Oil Solubility (Miscibility with Lubricating Oils)	yes	yes	yes**

*Based on 5°F Evaporator Temperature and 86°F Condenser Temperature.
**Separates into two phases at lower temperatures.

FREE! VALUABLE NEW FOLDERS! Write today for important new informative folders, "Genetron" Super-Dry Refrigerants for Air Conditioning and "Genetron" Super-Dry Refrigerants for Refrigeration.

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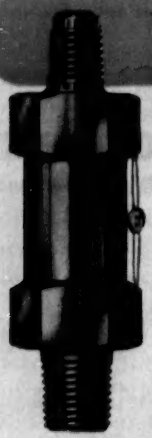
Basic Chemicals for American Industry

HENRY ASME relief valves

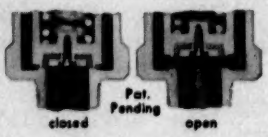
for Extra Capacity Extra Safety

FOR FREON AND SIMILAR REFRIGERANTS



Type 523 Straight-Through Relief Valves

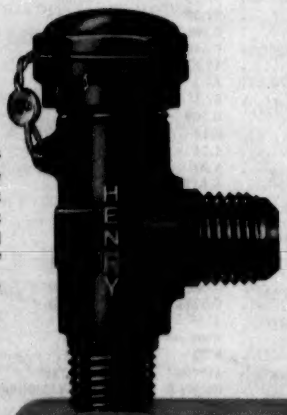
This relief valve has the Henry "Controlled Cushion" cup seat disc construction which prevents deformation of sealing ring and assures consistent operation. This design provides positive relief at predetermined set pressures. Brass construction. Sizes (inlet x outlet) ½" M.P.T. x ⅜" Flare; ½" F.P.T. x ½" F.P.T.; ¾" F.P.T. x ¾" F.P.T.; and 1" F.P.T. x 1" F.P.T.



"Controlled cushion" cup seat disc construction

Type 52 Angle Relief Valve

This forged brass valve is available in sizes (inlet x outlet) ½" M.P.T. x ⅜" Flare and ⅜" O.D.S. x ⅜" O.D.S.

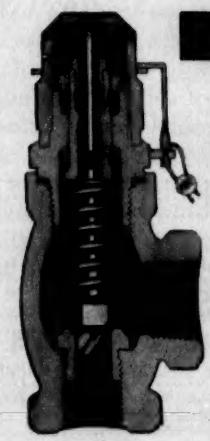


UV ASME

NB National Board Certified

All Henry Relief Valves in the sizes and types listed below are constructed in accordance with the standards of the ASME. In addition these valves are stamped NB to indicate National Board Certification as to capacities.

FOR AMMONIA



Angle Relief Valve

Has soft metal alloy seat and push rod for emergency reseating. Stainless steel trim. Sizes (inlet x outlet) ½" F.P.T. x ¾" F.P.T.; ¾" F.P.T. x 1" F.P.T.; and 1" F.P.T. x 1¼" F.P.T.

All the above valves can be furnished at any desired pressure setting in the range of 50-350 P.S.I.

Write us for data sheet #AE-1303 showing new increased capacity ratings of these Henry relief valves.

See your Henry wholesaler for these certified relief valves.

HENRY VALVE CO.

Melrose Park, Ill. (Chicago Suburb)

Cable: HEVALCO, MELROSE PARK, ILLINOIS

Specialized Manufacturers of the Complete Line of Relief Valves for Refrigeration and Air Conditioning

Fig. 1—New warehouse of the Palestine Cold Storage & Supply Co., Ltd. at Mishmar Hashiva, Israel.

New One-Story Warehouse Provides Modern Refrigerated Storage for Israel

D. FELDMAN
Chief Engineer
Palestine Cold Storage
& Supply Co. Ltd.

ISRAEL, recognized by United Nations as a state shortly after World War II, although an infant nation by comparison with the United States, just a youngster herself, has enjoyed the advantages of modern cold storage warehouses and refrigerated food distribution for a number of years. However, increased facilities for food processing and preservation are required for the increasing population. Answering this demand, a large addition to the present cold storage facilities of The Palestine Cold Storage & Supply, Ltd. has been made at Mishmar Hashiva near Tel-Aviv. The new plant (see Fig. 1) has a capacity of 750,000 cubic feet, is completely automatic, and handling of goods is by fork lift trucks and pallets (see Fig. 2). Four electric fork lift trucks, 1-ton capacity, do the actual work of loading and unloading, transporting and palletizing.

Cold storage warehouses of the company serve the population of Israel as stock-piling and distribution centers for frozen foods and refrigerated perishables. Of the goods stored, a portion are imports but the major quantities consist of locally grown agricultural produce; such as potatoes, vegetables, fruit and fruit juice concentrates, cheese, etc., received during their respective harvesting seasons. The imported goods, mainly frozen meat and frozen fish, come in comparatively regular consignments and are distributed by a wholly owned subsidiary concern, Frosted Foods, Ltd. Last year, for the first time, quick-frozen orange juice for export was stored at 0F. This article is produced by Jaf-Ora Limited, in which The Palestine Cold Storage is a major shareholder.

The constant increase of the population and its growing needs, together with the stepping up of agricultural production, called for a corresponding expansion of the Company's refrigerated space. Its four large cold stores, (See Figs. 1 and 3) located in the two big cities, Tel-Aviv and Haifa, and their environs, have a total volume of 1,600,000 cubic feet of refrigerated space. Two of these cold storage plants are located in the center of town and port, where the high value of the land imposed multi-storied construction as well as a limitation on handling space. When the need for increased cold storage capacity arose, the company decided

Fig. 2—Fleet of American-made fork lift trucks used at latest Palestine Cold Storage Company addition.

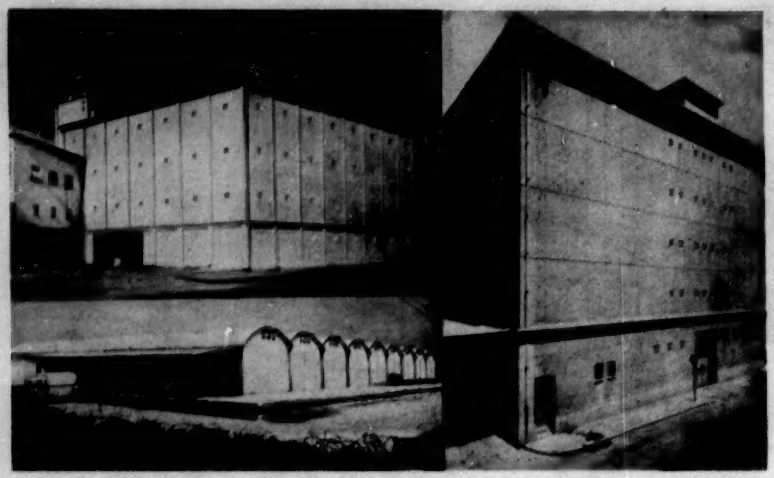


Fig. 3—Earlier cold stores at (top) Tel-Aviv, (right) Haifa and (bottom) Tel-Hanan. Fourth unit is larger, but of similar cellocrete and concrete construction as Tel-Hanan.

to leave the crowded town area and to build a one-story cold storage warehouse designed for modern mechanical handling and palletizing, at Mishmar Hashiva, three miles from Tel-Aviv.

2,000 tons) are fitted out for frozen foods at a temperature of 0 F or less, and the remaining 12 rooms (holding 4,000 tons) are for 32 F cooler storage. (See Fig. 4).

The refrigerating systems of the two independent sections have been so designed that, in case of necessity, all of the 18 rooms may be used for storage of fresh produce at or above 32 F. Actually the structure consists of two buildings, erected on simple and attractive lines, the main cold storage warehouse being separated by a covered passage from the engine room annex and the adjoining office wing. The main building is a one-story structure on dock level, 340 feet long and 165 feet wide. A 16½ ft. wide platform runs along one side, 4 feet above the roadway, with room for more than 20 trucks at one time. An overhead canopy 30 feet wide protects the goods on the platform and the trucks from the sun and rain.

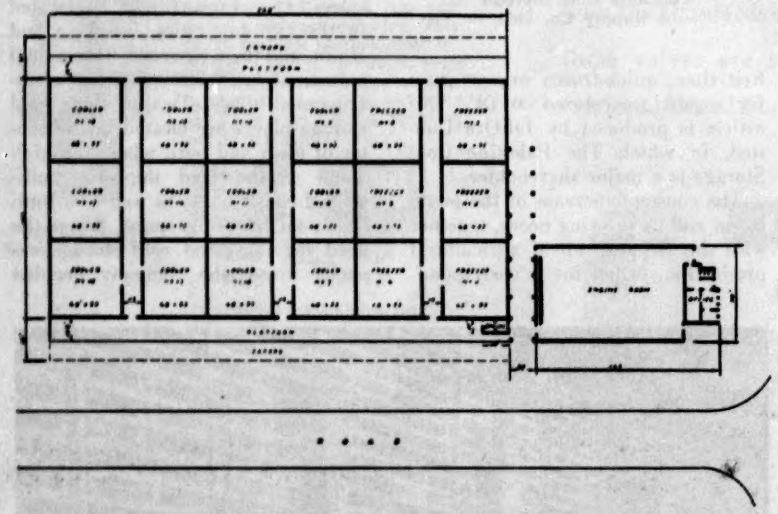


Fig. 4—Floor plan of the 18-room storage; 12 coolers and 6 freezers.

Construction Details

The new plant is not far from the large agricultural areas supplying Tel-Aviv and its suburbs, and is readily accessible from the main Tel-Aviv-Jerusalem highway. The company purchased a plot of 11 acres and erected an 18-room cold storage which, with the service building, occupies in all 75,400 square feet, with a total volume of 750,000 cubic feet net of storage space. There is room for extension up to 2,000,000 cubic feet. Out of the present capacity of six thousand tons, six rooms (totaling

Cold Storage

The cold store is composed of three sections, with six rooms and a corridor in each section, the idea being to separate goods having different odors. The 18 cooling rooms are of uniform size, 53 feet x 48 feet, holding approximately 335 tons each, with a clear height of 16 ft., permitting high stacking with fork lift trucks. The rooms were sized to provide for the most convenient accommodation of goods and easy palletizing, with enough free space to enable unhampered movement of fork trucks. Entry corridors 15 feet wide allow two-way traffic of the fork trucks.

As the height of the corridors is only 13 feet, their roofs form three passageways between the end walls of the roofshells on the top of the building, allowing easy access for servicing of the mains, valves and automatic equipment installed on the outer walls of the cooling rooms. The main building is of concrete. The self-supporting monolithic walls carry the reinforced concrete roof, built in the form of shallow shells, with beams spanning the width of the chambers. Thus the need for pillars was obvi-

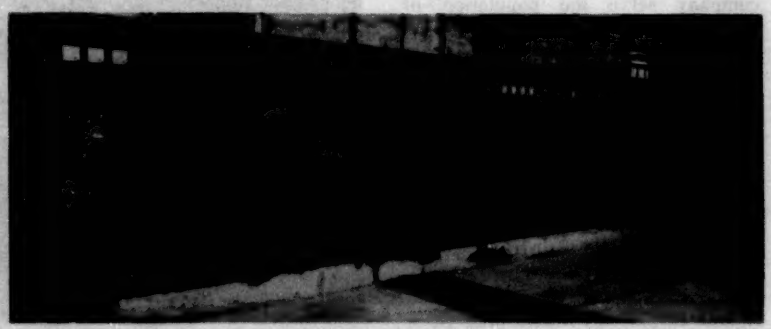


Fig. 5—Switchboard in the Engine Room. Electric controls and switchgear permit entirely automatic operation of refrigerating systems.

ated and only relatively small quantities of cement and steel were required. The air ducts were laid along the arch of the shells.

Insulation Applications

The cold store is of the insulated warehouse type, i.e., each chamber is individually insulated, because of seasonal occupancy fluctuations. A double spray of bitumen serves for moisture proofing. Cork and cellocrete, with a density of 18.5 lb. per cu. ft. and thermal conductivity of 0.35 Btu/in/ft²/F/h, were used for insulation, the latter in view of the satisfactory results obtained in the past when cork was not readily available. A 4-inch thickness of cork was applied on the ceilings and cellocrete was used on walls, floors and roofs.

Two layers of cork were laid with "Flintkote" mix onto the curved shuttering of the shells and, after the steel reinforcing had been put in place, the shell concrete was poured. The cork on the ceiling was plastered with "Flintkote" and then whitewashed. Cork sealing strips were laid all over the walls, ceilings and floors, in widths sufficient to insure that heat leakage is kept to the normal rate. Cellocrete insulation was cast onto the walls, in various thicknesses, with the aid of sliding shuttering. The cellocrete and cork strips were plastered over with cement and then whitewashed.

Eight inch cellocrete was poured on the roofs of the 32 F chambers and a 16 inch thickness over the 0 F rooms, serving as additional insulation against heat infiltration and to protect the concrete of the shells from the direct rays of the sun. The cellocrete on the roofs was thereafter weather and water-proofed by jute and two coats of bitumen and subsequently whitewashed. The floor consists of a layer of concrete above the gravel fill, 12 and 20 inch layers respectively of cellocrete insulation and a concrete wearing surface. As a large quantity of fill was used, and the overall value of the floor insulation is high, and the underground water level low enough, it was not considered necessary to use additional precaution to prevent frost heaving.

Fig. 6—Engine Room, showing three electromotor-driven vertical single-cylinder compound compressors, and a brine cooler with associated pumps and piping.

Machinery and Controls

The design and supply of the main machinery for the engine room, and of the coolers and grids in the chambers were entrusted to Messrs. Sulzer Brothers Ltd., Winterthur, Switzerland, who included in the set-up of the machinery two shell and tube horizontal ammonia evaporators made by a local refrigeration firm, Tassan Ltd., of Haifa, and two shell and tube horizontal condensers and cooling towers built by another local firm, Messrs. E. Herz, Ltd., Tel-Aviv. The equipment is driven electrically, purchased from the local Electric Corporation after transforming into 380 volts supply.

In the event of a power failure, there is a standby Sulzer diesel generating set, 375 hp, 305 kva. Combined switchboards, manufactured by Sprecher & Schuh, Aarau, Switzerland, have been provided for the electric supply and the diesel generating set, which are interconnected in such a manner that after the diesel generating set has been started up a simple change-over enables the continued operations of one set of the refrigerating machinery. This will suffice for holding temperatures at the required level in all eighteen rooms.

All switches, fuses and automatic controls of the refrigerating plant are centralized on the main switchboard. (See Fig. 5). Control wiring runs from the switchboard to all parts of the warehouse. In case of failure of any machine, an alarm sounds and a signal lights up, designating the machine in question.

Fig. 7—Cold Room No. 10. Blower coil erected in corner is water defrost type, discharging into slotted horizontal ducts located in center of each ceiling shell.

Brine System Chosen Again

As cooling medium for the cold rooms and the freezers, brine was chosen, considering the previous experience in the other warehouses of the company, as well as for the following reasons: The ammonia system is concentrated in the engine room

only and no leaks can endanger the rooms and goods; leaks may be easily detected; the controls are not complicated, the systems are fully automatic and set up to operate with occasional checking by a watchman; defrosting of the grids by warm brine is simple and very convenient, and temperature fluctuations are minimized by a continuous flow of brine.

Although a large quantity of piping in the rooms and in the evaporators became necessary to minimize the split between rooms, brine and ammonia, it was considered that the economy in operation and maintenance outweighs the extra cost of amortization as well as the extra cost of pumping and the higher expense of working at lower temperatures than by direct expansion. On the other hand, the extended cooling surface gives high relative humidity in the rooms up to 85-90 percent. Instead of calcium chloride, which has to be imported, brine from the Dead Sea is used with satisfactory results.

For the two-temperature level, separate sets of machinery are used, (See Fig. 6), each comprising evaporators, compressors, condensers, brine pumps and brine mains. Each set includes a Sluzer compressor, vertical compound single cylinder, of 100 tons at standard conditions, running at 480 rpm and direct driven by a 170 hp slip-ring Oerlikon motor. The compressor is automatically started by the thermostat in the brine accumulator, which operates the water pump and the cooling tower. A third similar compressor serves as a reserve and can easily be switched into automatic operation.

The evaporator of each set is of the horizontal shell and tube type, fed by a high-pressure float valve from the receiving bottle of the horizontal shell and tube condenser located on the roof of the engine room. Each cooling water system comprises a water pump and a mechanical induced draft cooling tower, built of concrete, with wood fill and upstream spray, and a horizontal propeller fan 9 feet diam., gear driven from a motor. The tower cools water within a range of 4-5 F.

Thermo-Actuated Room Units

To maintain the different room temperatures, every room is equipped with a thermostat which automatically starts and stops fans and brine pump of the respective set. The brine pump starts the moment even one room requires refrigeration and stops when no room requires refrigeration. Every brine circuit includes a brine accumulator of 1,200 cubic feet to prevent the short cycling of the compressors, and has a reserve brine pump. In each circuit the brine flows to the rooms through a well insulated 8 inch two-pipe main laid on top of the cold store building, where they branch out into the separate rooms through a set of hand operated and automatic valves.

Every room has a unit type cooler, with extended surface of finned coils and a horizontal propeller fan of 4 hp, delivering the re-circulated air over the coils into the rooms through galvanized iron ducts placed in the curvature of the roofshells. (See Fig. 7). The coils are accessible through the doors all over the surface of the cooler casing. Outside air can be introduced through windows in the end walls of the roofshells, looking into the passageways over the corridors. Defrosting is easily done by spraying water through sprinklers situated above the coils. In addition to the coolers, grids underneath the roof shells are arranged in the 0 F chambers. The ceiling piping network can be thawed off by circulation of warm brine from a central point and this is done quickly and inexpensively.

To simplify supervision of the cold storage, a remote thermometer installation, made by Trub and Taub, Zurich, Switzerland, has been set up in the engine room, with one indicating and four recording 6-point instruments, and with 25 points for measuring and registering of temperatures in the rooms, corridors and brine accumulators. Operation of the plant requires no manual regulation and the two engineers employed only have to supervise the smooth working of the automatic controls, make routine checks in the cold rooms and maintain the machinery and mechanical handling equipment.

Ice Bags for Fishermen Sell Ice and Decrease Pilferage

THE MIAMI plants of the Royal Palm Ice Company have come up with an idea which has increased ice sales and at the same time reduced pilferage of the company's own ice bags. A specially made light weight bag is on display at Royal Palm plants in the Miami area. This bag is very similar to the ordinary delivery bags except it is of a lighter weight material and contains a little more waterproofing. A Pittsburgh firm manufactures the item according to specifications prepared by the Royal Palm Company.

Since these bags have been on sale at the ice plants, there has been a decided decrease in the disappearance of the company's own delivery bags which had proved to be quite a temptation to the fishermen. Robert E. Bradley, Royal Palm sales manager, says that only a few cents profit is made on each bag, but the idea has been found an excellent means of promoting good will and increasing ice sales to fishermen. About four or five hundred bags were sold last year at a retail price of $4.25 each.

Fish bags (upper left and right) suspended for display on vending platforms of Royal Palm Ice Company, Miami, Florida.

Bags on Display In Showroom Window

The bags are on display with beverage coolers in the showroom windows, and they are also hung from the ceiling in front of the automatic ice service chutes. Sales offices are open from 4 am until 10 pm all year round for the convenience of fishermen. The firm also sponsors a portion of an early morning fisherman's radio program, and the availability of the fish bags is mentioned on this program.

The bags are a slightly different color from the regular ice bags, and they have a picture of a fish stenciled on them. A number of the bags are also used by commercial fishermen. Royal Palm has three plants located on the Key West highway between Miami and the Keys. H. C. McConnell is vice-president and general manager of the company, which has a total of 14 plants in Florida.

You CAN Keep Your Cold Storage Doors From Freezing Shut

F. ODENDHAL
Vice-President, Engineering
Jamison Cold Storage Door Co.
Hagerstown, Md.

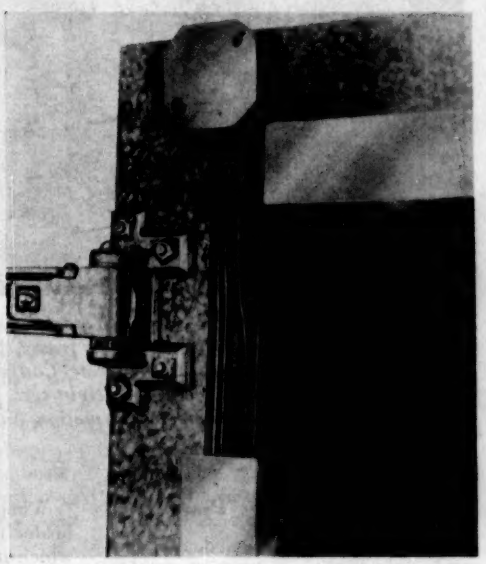
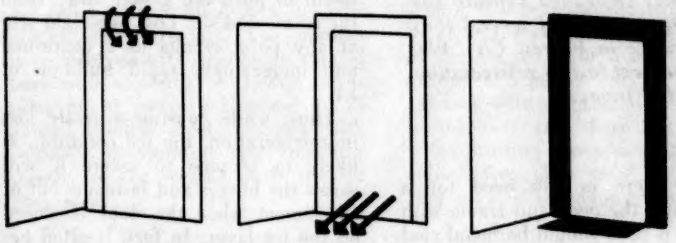


Fig. 1 (below) — When cold storage door is opened (left) warm moist air goes in at the top. Cold dry air (center) rushes out at the bottom. A built-in heating unit prevents condensation on the shaded frame and sill areas (right).—All photographs Courtesy Jamison Cold Storage Door Co.

Fig. 2 (right) — A close-up of heater cables with a section of the cover plate removed.



PERENNIAL problem in the operation of cold storage doors for low temperature service has been their tendency to freeze shut. Generally, freezing comes from the build-up of ice on the gasket contact areas of the door frames and sills.

This condition is most acute on door installations between a cooler, air lock or vestibule, held at approximately 35 to 45 F, and a freezer or sharp freezer where temperatures are 10 F and lower. The problem exists wherever there is condensation around the doors and temperatures low enough to cause freezing of this condensation.

Since the gasket contact areas of doors for low temperature service are usually clad with metal, which is a ready conductor of heat, these areas are normally chilled below dewpoint of air in the room into which the door faces, opens or is mounted. As a result, condensation forms on these chilled surfaces. This also happens to wood surfaces, but not as quickly.

How Condensation Occurs

Fig. 1 shows essentially how condensation occurs when the door is opened between two rooms of normal and very low refrigerating temperatures. When the door is opened, warm moist air enters at the top. At the same time, cold dry air rushes out at the bottom. During this exchange of air, condensation forms on the frame and sill areas.

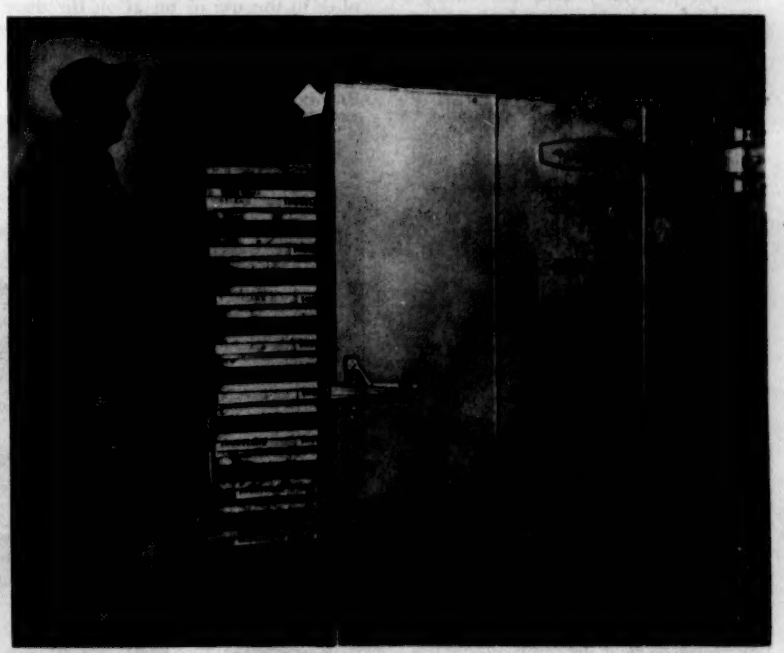


Fig. 3 — Heating cables in this double super freezer door installation at Shoreland Freezers, Inc., Salisbury, Md., keep the gasket contact areas completely free of frost and ice. The cables are embedded in the frame and also in the active leaf near the astragal (see arrow). This door serves a minus 40 F blast freezing room.

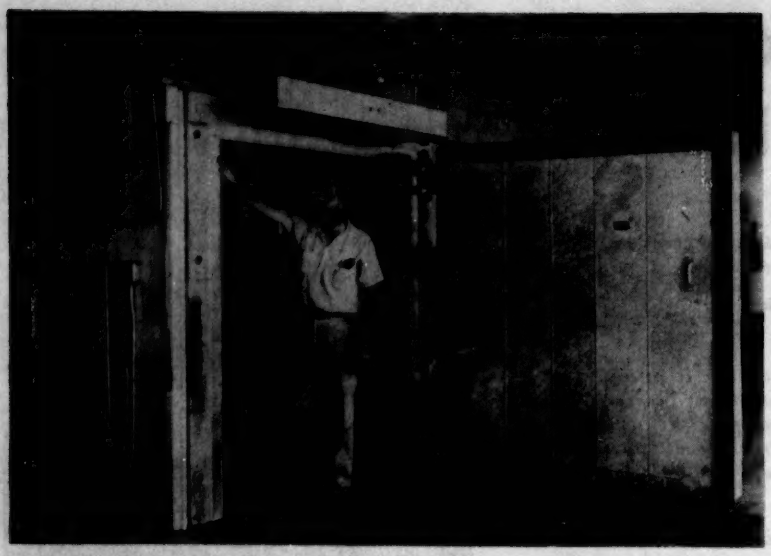


Fig. 4 — A super freezer door with heater cables embedded beneath the cover plate on all three sides of door frame. Door is one of several thus equipped at Fosgate Citrus Concentrate Cooperative in Forrest City, Fla. The feature is reported to maintain a tight seal, prevent loss of refrigeration and eliminate ice formation on the frame.

How Freezing Takes Place

First, the door is opened, and the warm air moisture deposits on the cold door frame. When the door is closed, ice forms between the gasket and the frame and sill. In extremely low temperature cases, the outward swirl of cold air around the lower half causes icing even before the door is closed.

Ice formations cause the door to freeze fast, making it difficult to open, and causes loss of refrigeration due to lack of a tight seal. Such icing also damages the gaskets and sometimes the door itself . . . to say nothing of the ill effect it has on operating efficiency through the doorway.

To prevent icing, operating firms and door manufacturers have devised means of keeping gasket contact areas at a temperature above the dew point. In most all applications this is done through a thermostatically controlled heater unit (Fig. 2) embedded in the frames where the gaskets on the door make contact. The unit is generally concealed by removable stainless steel cover plates.*

*Jamison Cold Storage Door Company's heating unit, known as "Frostop", consists of heater cables laid in asbestos-lined channels that are cut in the casing. Inside this channel and adjacent to the cables is a 10-ampere thermoswitch wired for easy adjustment. Wiring connections are made in an outlet box attached to the upper corner of the frame (See also Fig. 2).

When there is any need for a heater unit, the door and frame with which it is used should be metal clad for best results. Most doors for low temperature service should be metal clad to protect the wood against condensation. The same reasoning applies to the use of metal on the door frame. It is also common practice for low temperature applications to have the metal vapor barrier on the warm side of the door and frame. Of course the heating unit must be installed on the same side. This arrangement is more economical from the standpoint of both heater performance and refrigeration efficiency.

Heater Benefits Listed

Principal advantage in the use of electric thermal units is frost and ice prevention on door frames, even where temperatures are as low as minus 50 F. Special units are available for even lower temperatures. As a result, doors open and close easily at all times because there is no ice to either freeze them fast or prevent them from closing fully.

Another benefit is that life of the gasket is extended considerably, because the gasket contact areas are kept warm and dry. Without the heating unit, ice would form and begin to push the gasket away from the frame and sill. Loss of a tight seal at any point results in a continued and increasingly rapid build-up of ice.

Thus, while causing a costly loss in refrigeration, the ice condition is likely to become so severe it will throw the hinges and fasteners out of adjustment when the door is closed on the ice layer. In fact, it often becomes necessary to pry open a frozen door with a crowbar. Use of a heater unit, however, helps to maintain the tight seal necessary for efficient refrigeration operation; a third, but probably the most important asset.

Frames with heater units have been used already in widely varying

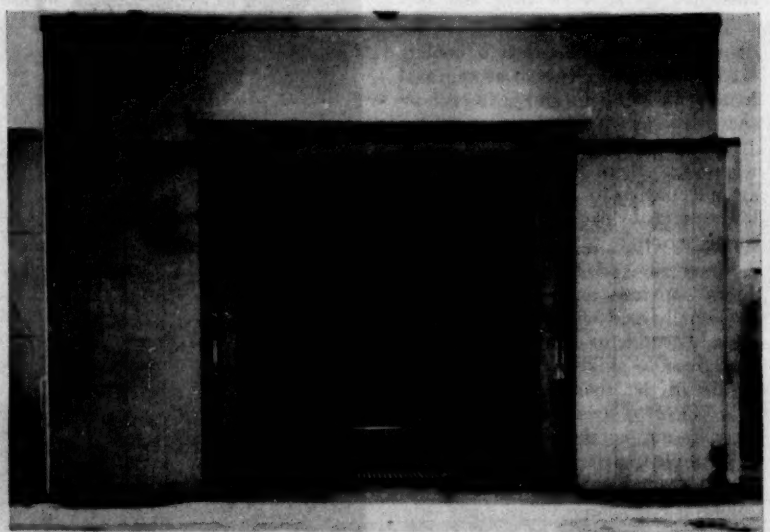


Fig. 5 — Despite the size of these huge Jamison double super freezer doors, the heater cables prevent moisture condensation and ice formation on the frame when temperatures run to minus 40 F and lower. This is a low temperature laboratory for petroleum products testing at the California Research Corp., Richmond, Calif.

door installations including low-temperature doors, freezer doors, super freezer doors, auto-close doors, vertical and horizontal sliding doors, and passing doors. In every case known, the units have prevented moisture condensation and ice formation.

Safety in Sill Applications

Depending on the need for frost protection, cables may be installed in the frame (sides and head) with or without a sill unit. However, heating units may be installed in all types of door sills . . . high sills, beveled wood sills and concrete sills. While sill heaters are optional, it is important to note that from a safety standpoint alone sills need protective warming even more than the casings.

In better concrete sill installations, the casing is cross connected with a specially fabricated 3-inch steel channel fitted with a filler in which the heater cables are laid. The channel is re-enforced with steel angle, tapped bars and anchors. A heavy cover plate of 10 gauge galvanized or 14 gauge stainless steel, fastened with countersunk stainless steel machine screws, makes contact with the sill gaskets.

With high sills, the sill casings are supplied with heater cables and cover plate the same as the side and head casings. When the sill is of beveled wood, a channel is cut in the top of the sill just as in casing fronts. The cables are then applied in a similar manner. The cover plate of either 10 gauge galvanized or 14 gauge stainless steel, like that with concrete sills, is fastened with countersunk wood screws and makes contact with the sill gaskets.

If a door installation includes a wood sill, it is important that the various wood surfaces and adjacent joints be carefully sealed against vapor and water. In addition, they should be firmly anchored and bolted down to prevent distortion.

Converting Existing Doors

Doors already installed and in operation can be equipped with heaters by replacing the existing casing (face of the frame) with a new one containing the heater cables. Likewise, existing sills can be altered or replaced to contain these features.

On infitting doors, since the heater cable cover plate must extend over that area of the door casing against which the gasket makes contact, the use of heavy metal protection to form corner guards is somewhat limited. The cover plate itself extends over the areas normally occupied by an angle iron corner guard. Consequently, the area most vulnerable to damage by heavy trucking is the cover plate.

Corner Guards Applied

On the other hand, the cover plates on super-freezer door casings are located so that corner guards can be applied as a safeguard against trucking. Here the heater cover plates are located away from the inner edge of the casing so that corner guards continue around on the casing front for an inch or better.

When such heavy metal protection is required on the frames, it is usually advisable to use the super freezer type door with heater cables. In such cases, it is recommended that the doors be fitted with 2-inch wide felt gaskets in lieu of standard 4-inch molded sponge rubber, so that the gasket will contact the cover plate only. The gasket should not touch any cold heavy metal protection or corner guards.

Special Device Protects Gasket on Bottom of Freezer Door

ONE of the problems of maintenance in refrigerated warehouses is the wiper gaskets on the bottom of freezer or tunnel doors. This has been tackled by Frank Degan, manager of the National Ice & Cold Storage Company, Watsonville, Calif., who comes up with the following solution.

According to Mr. Degan, Pete Taylor, chief engineer, developed an idea which was installed. A bar of channel iron 1½ inches wide to which a piece of 2-inch Chase gasket material is attached, is suspended from a piece of pipe and brackets on the door allowing movement of the channel iron up and down. The channel iron and gasket material is long enough to cover the area inside the door casing. Two small lugs extend beyond the channel iron so that when the door is closed they are caught between the door and the casing forcing the channel iron and gasket material against the floor, forming a perfect seal. When the door is opened the spring fastened in the center of the channel iron and to the center bracket pulls the channel and gasket material up free from the floor and the door swings open without drag or damage to the gasket. The pictures will help in understanding the device.

The cost of making and installation is nominal, says Mr. Degan, and it has been successful in meeting the problem of doors freezing.

Showing how special device protects wiper gasket on bottom of door; left looking from outside, the device lifted to permit opening of door; right, looking from inside, when door is closed.

Florida Ice Company Modernizes Plant And Expands Operation

RAYMOND DAVID
Duval Ice & Coal Co.
Jacksonville, Fla.

SEVERAL years ago it became apparent to many ice company owners that-if we hoped to maintain a profitable operation we had to make some progress along the following lines: (1) Reduce production and distribution costs; (2) Develop new markets for our product. Within the past two years our company has made several strides toward the above goal and the results look encouraging.

Front wall of Duval ice plant showing outlets for self-service

First, in order to reduce production costs, we added necessary controls to our engine room equipment so that the electrically driven compressors start and stop automatically. Briefly our system work as follows:

(1) Freezing tanks are equipped with thermostatically controlled solenoid valves on the liquid ammonia lines to the tanks. We use a flooded system and when the tank temperature reaches 18 F the solenoid valve opens, sending liquid ammonia into the tank. When the tank temperature reaches 13 F, the solenoid closes, cutting off the flow of liquid ammonia to the tank.

(2) Compressors were set up to start and stop automatically on pressure controls. The pressure regulators on the compressors are set to start the motors when the suction pressure reaches 30 psi and to shut down the unit when the suction pressure drops to 10 psi. Each compressor also has a check valve on the discharge line and an automatic unloading by-pass remains open when the compressor starts up, allowing the motor to come up to speed under no load. When the motor reaches its synchronous speed, the by-pass closes, throwing the full load of the compressor on to the motor. The check valve in the discharge line prohibits the pressures on the suction and discharge from equallizing when the compressor is not operating.

Each compressor is also equipped with an automatic cut off switch that shuts down the unit if the oil pressure is low or if the discharge pressure reaches 250 psi. The high pressure cut off (250 psi) must be reset manually so that the operator must find the cause of his excessive discharge pressure and correct it before the unit will resume normal operations.

(3) We use blower evaporator type coolers in our storage rooms that are connected to hot gas defrost automatically four times each day. These units have proven to be very satisfactory. This system has its own compressor system that operates independent of the other units.

Simple Operation

As can be seen, the cycle of operation is quite simple. When the tank temperature goes above 18 F a solenoid valve opens the liquid ammonia line into the tank. As the ammonia evaporates in the tank, the suction pressure on the compressor increases. When the suction pressure reaches 30 psi the compressor starts and continues to run until the suction pressure is pulled down to 10 psi. As long as the liquid ammonia line to the tank remains open the suction pressure will remain above 10 psi. As soon as the tank temperature reaches 13 F the solenoid valve on the liquid line to the tank closes and the suction pressure is pulled down rapidly to 10 psi at which point the compressor shuts down.

We have found the above system superior to our previous operation in many ways:

(1) The compressors only run when they are needed.

(2) The ice does not crack when pulled for the tank temperature does not drop low enough to cause cracking.

(3) Shift operators are not needed on the two night shifts, permitting us to lock up the plant at night (when it is not necessary to pull ice on the night shift).

Retail Sales Streamlined

At the time the above changes were made in the production end of the business, we also made changes that helped streamline our retail sales at the plant. The front wall of our plant was sealed off, leaving only seven small openings. Behind these openings were installed seven coin operated vendors.

Now all of the calls for above items are self service with a consequent material saving in labor. Our plant is so arranged that the fence about the plant can be locked, leaving only the wall with the vendors available to the public for night sales.

To provide another outlet for ice ten self service vendors have been installed throughout the city that dispense 10 lb bags of cubes and 25 lb. blocks of ice. These stations have been well received by the public and in our estimation represent completely new business to the industry.

To improve our ice processing and packaging operations we renovated an old storage room and equipped it with a blower evaporator cooler to keep the temperature well below freezing. The bins on our ice sizer were enlarged so that 25 three hundred pound blocks of ice could be crushed without removing any sized ice from the bins. Our cuber is located outside the storage room but the cubes are carried by an elevator to the necessary height and drop through an opening in the storage room wall into a large bin. Sized ice and cubed ice flow from the bins to an automatic weigher-bagger and from that point, through our sewing machine and then to storage.

Safety Cuts Losses and Saves Money

Why preventing accidents produces savings in the plant and how this can be accomplished

A. R. CARSTENSEN
Crystal Ice & Cold Storage Co.
Sacramento, Calif.

THE SAFETY record of the warehousing industry as shown in the tabulation here is a disgrace to an industry of our standing, and it is costing us a lot of money. The question is — what are we going to do about it.

	Injuries per 1,000,000 man hours worked		Lost Time Days per 1,000 hours worked	
	1952	1953	1952	1953
Warehouse Industry (Average) NARW Survey	38.85	36.94	1.84	1.378
All Industry (Average) National Safety Council	8.40	7.44	.88	.83

Dollars and Cents Cost

First let us consider the dollar and cents cost to us due to our poor experience. The manual compensation rate for all classifications is based on the past experience of all plants within each state. (In California the experience of the previous three years are considered, but in some states as many as five years may be considered.)

As an example the manual rate set by the commission for warehousemen in the Chicago area is based on the combined experience of all refrigerated warehouses in all of Illinois. What your competitor in your state does about accident prevention affects your pocket book. This problem of safety is an industry problem as well as an individual company problem. If your experience is average you will pay the manual rate, but your rate will be higher or lower than manual as your experience varies up or down from the average.

Compensation premium payments are only a part of the story. Safety engineers who have made a study over a long period of years tell us that in order to arrive at the total average cost of accidents we must add the compensation and medical payments together and multiply that figure by five. These additional costs result from such things as damaged materials and equipment, time lost to confusion, additional clerical work, and cost resulting from the absence of trained employees.

Humanitarian Aspect

Secondly let us consider the humanitarian aspect. Supervisors are responsible for the welfare of the employees working under their direction, and in any successful safety program these supervisors are the key men in that program. I am sure you would not want the death or a serious injury to one of your men on your conscience, knowing full well that ninety percent of these accidents can be avoided.

Indirect Benefits

The third reason you should be interested in safety is because of the indirect benefits gained. A well rounded safety program will help greatly to improve employer-employee relations, and it will bring about a more efficient operation in the plant or department. As a worker takes an interest in safety, and learns safer procedures, his interest in his job will increase and his efficiency will increase. No employee will deny that a combined effort in accident prevention is for his own good.

It certainly should not be necessary for us to dwell long on the importance of safety in our plants. Your National Association through the safety committee is doing all possible to arouse owners and top management in the industry to the importance of this subject.

How to Set Up A Safety Program

The question that logically comes next is how do we set up and carry on a successful safety program. Represented in the industry are companies that have a well rounded program, companies that have an inadequate program, and many companies that have practically no safety program at all. Regardless of which category a company comes in, it should benefit all of them to review the logical steps in setting up and maintaining a proper program.

First, we must have the authority from top management with an assurance of continued support. This authority must be accompanied by an appropriation of funds to work with.

Next comes the step of selling the employees. Without the enthusiastic support of the employees the program will fail. Particularly in the first stages, you must dramatize safety. Have meetings with all the employees and use specific examples of serious injuries to the men and their fellow workers. Talk to them about injuries to their wives and children, and point out how a safety program and safety practices at work will be carried into the home and off the job. If you publish a house organ, it is a wonderful means of telling the story to both the workers and their families. Bulletins and personal letters from management can be used effectively.

Organize Safety Committee

The third step is the organization of a Safety Committee or committees, according to the size of the operation. Choose the most enthusiastic employees as members of the first committee. Choose leaders. In a small operation one committee of three or more employees can carry on all the functions necessary. Larger operations may choose to have a general committee, and a second committee which has as its chief duties investigation of accidents and making recommendations to the general committee.

As it goes along it is well to rotate the committee members. Some outstanding results have been experienced by placing the most careless workmen on the committee one at a time. In multiple plant operations the organization should be expanded at the top with some person responsible for safety for all plants, but the individual plant organization should remain about the same.

From paper presented at NARW-TRRF Training Conference, Chicago, Ill., January 10.

Duties of Safety Committee

The Safety Committee or committees is responsible for the safety program, so let us list some of the responsibilities and duties of the committee.

1. *Regular Meetings*: Unless regular meetings are held and the ball is kept rolling the program will fall flat. If busy seasons and pressure of business is allowed to interfere with or delay meetings, the whole safety program will falter right when it is needed the most.

2. *Written Minutes*: Written minutes of all safety meetings will accomplish several things. The committee members will have a reminder of things to be done and procedures to be followed, top management will be informed of progress made, and future committee members will have a reference of past progress and procedures.

Plant Inspections

3. *Inspection and Reports*: Regular plant inspections are an effective tool in safety. Proper reports of the findings should be made to top management and the department heads. If top management is not represented on the committee making the inspections, then a representative should be invited to participate in at least a part of the inspection tours.

4. *Good Housekeeping*: The Safety Committee should be empowered to enforce good housekeeping for this is a most important part of any good safety program. It is one of the most effective ways of making the rank-and-file employee conscious of the entire program.

5. *Investigation of Accidents*: All accidents should be promptly investigated with the emphasis on discovering the cause of the accident and finding ways of preventing future simular accidents rather than fixing blame. When a physical change is required, prompt action should be taken if full benefits are to be realized. Investigation of near accidents is also very effective. We term a near accident as a situation where no person was injured and no damage was done, but where but for luck, an injury would have occurred. Many accidents can be prevented by investigating and taking action when near accidents occur. This is particularly important when the program progresses to the point where very few accidents occur. It helps to keep the committee active and the entire program alive.

6. *Putting punch into the safety program*: The safety committee must keep the program alive. A positive approach must be used even though the aim is to prevent. Punch can be put into the program by the use of contests with worthwhile awards, proper publicity and enthusiastic support of the employees. A good way to keep interest high is by the use of a theme of the month. Select one phase of safety to be emphasized each month: Such as "Safety Shoe Month", "Traffic Safety Month", "Safety with Hand Tools". "Safety in Lifting", "Fire Prevention", etc. During these designated months, the theme should be well publicized, special training program meetings should be built around the theme, and appropriate posters should be displayed.

7. *Recommendation To Top Management*: It is the responsibility of the safety committee to make recommendations to top management on physical changes necessary to eliminate hazards, and necessary changes in work procedure.

8. *Disaster Drills*: Fire and disaster drills effectively planned and executed can prevent disasters which may well wipe out the entire plant and eliminate the jobs of all employees. This is an important subject.

Orientation of New Employees

9. *Orientation of New Employees*: Statistics show that a large percentage of accidents are caused by new employees. Every new employee should be properly introduced to the safety program and acquainted with any safety rules on the plant. He should be properly trained in safe procedures while he is being taught to do his job. Follow through is important, one shot is not enough. Older employees working with a new employee should shoulder the responsibility of making the new man safety conscious.

10. *Physical Examinations*: The safety committee should seriously consider the advisability of pre-employment examinations which have been found very helpful in eliminating physically unfit applicants, and aided in placement of new employees in jobs which they are best fitted for physically. Periodic physicals for older employees should be considered.

11. *Safety Shoes*: The committee should do a thorough job of selling all employees on wearing safety shoes at all times while on the job. The selling job comes first, then the company rule and enforcement. Safety shoes can now be purchased in any style desired, including dress oxfords, so all supervisors should set the example by wearing safety shoes.

This is the eleventh thing I have suggested that a safety committee can do, and there are more to come but I would like to deviate for just a minute to emphasize the importance of wearing safety shoes. Your NARW safety committee survey reveals that one third of all lost time injuries in warehousing are injuries to feet and toes. Safety shoes will eliminate practically all of these injuries. If every warehouse would get the men in their plants into safety shoes, they would eliminate approximately 30 percent of the lost time injuries for the entire group. Would you ask for a more direct approach to the problem than this?

12. *Training of old employees*: Safety training should never stop, regardless of the length of service represented by the employees. Constant reminders are necessary, and constant training is the only way to maintain a good record of accident prevention.

13. *Color Coding*: Some plants have found color coding of all pipe lines, conduit, walkways, moving part of machinery, guards, etc., an effective method of improving housekeeping, preventing some types of accidents. By color coding we simply mean painting things by color so that they can be readily identified. Your association safety committee hopes to present a program for color coding which will lead to a more universal application in our industry.

14. *Safety Codes*: Safety codes or rules is another aid in accident prevention. I want to sound a warning, however, that simply publishing safety rules will not go far in preventing accidents, at best they are only an aid in training new employees and a reminder to older employees if properly utilized.

Safety Off the Job

15. *Safety in the Homes and off the Job*: When an employee or a member of his family is seriously injured at home or away from the plant, you feel the effects on the job. If employees are properly trained in safety on the job, this training will find its way into the home, but greater success can be realized by directing the program into the home. This can be done by mailing literature to the home, and by having occasional safety meetings in the evening with the wives present. There is no better way to improve employee relations than by reaching into the home with your safety program.

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OF
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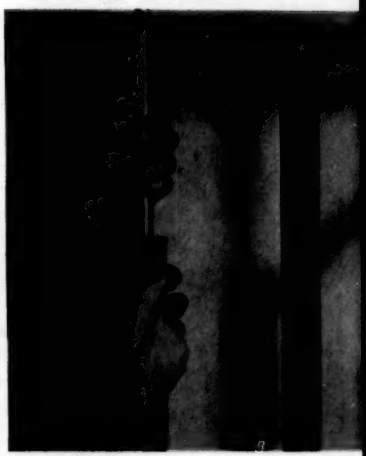
Armstrong Armaflex combines low cost with high efficiency. It will withstand temperatures from 32° F. to 200° F. Its foamed plastic composition is made up of uniformly sized, closed cells that make it air tight and waterproof. No vapor barrier is needed. Armaflex is manufactured with inside diameters of ⅝", ⅞", 1⅛", and 1⅜". Because of its flexibility and resilience, it will fit pipe and tubing with the same or closely corresponding outside diameters.

Armaflex is one of the many new products developed by Armstrong Research to help solve your high- and low-temperature insulation problems. **For free booklets,** with full details on Armaflex as well as the entire line of Armstrong Industrial Insulations and complete Contract Service, call your nearest Armstrong Office or write Armstrong Cork Company, 208 Stratton St., Lancaster, Pa.

*Trade-Mark



Installation is easy. Simply slip Armaflex over straight or bent tubing or pipes. Being flexible, it goes on easily over sweated couplings.

Armstrong INDUSTRIAL INSULATIONS

The Packer and the Warehouseman — What Each Expects of the Other

JOHN FOX
President Minute Maid Corp.

THESE days when everyone is busy taking a bow for the great increase in popularity of frozen foods, I think we are all inclined to overlook the role that has been played by the refrigerated warehousemen. In a sense, he has become the "forgotten man" of the industry. I would therefore like to take this opportunity to hand out a few well-deserved kudos in his direction.

For keeping pace, and in some cases even anticipating the pace, with advance planning, for risking his capital in large amounts and providing the many special services that the changing industry has demanded, I think that all of us in the packing fraternity owe the refrigerated warehousemen a deep and everlasting debt of gratitude.

It seemed to me that I could best serve the warehouse industry in the time allotted by telling you briefly what I think the packer has a right to expect from warehousemen and also what, in my opinion, the warehouseman has a right to expect of the packer.

What the Packer Expects

First, and perhaps quite obviously, the packer expects the proper protection of his merchandise in order that the quality that he has built into the product will be maintained until it reaches the consumer, or at least until it becomes available to the consumer at the retail store level. To do this the warehouseman should treat the product as though it were his own and not something over which he merely has custody.

On this question of quality protection, something has come to my attention which is undoubtedly known to most of you but which I think bears review aand continued concern by packer and warehouseman alike. This concerns the actual movement of inventory on a first-in — first-out basis of stocks of merchandise that tend to deteriorate, or upon which label changes have been made. Our warehouse people are continuing to find many instances of merchandise, lot numbers of which indicate that it has been moved out on paper but physically is still in storage. In office procedures the warehouseman has done a perfect job — that is, they have always posted the cases withdrawn against the oldest lot record. However, out in the warehouse the lads have not been so particular. Obviously, they have followed the course of least resistance and unloaded the most recent truck or carload in front of the product already in storage and then in making deliveries have taken the most convenient cases available which were in front. Those in back just got older and older. We have found products in storage several years old which, according to the records, had been released long, long ago, and I regret to state that the quantity of these cases was unbelievably large.

I'm sure the top management of the warehouses do not know this is going on. They assume that the operating personnel are doing the same kind of a job that the office personnel is. Obviously, they must check the cold room operations more frequently in order to prevent this. And more important, it seems to me that they should indoctrinate their operating personnel on the reasons why this policy must be enforced to the letter.

Impounded Merchandise

There is a somewhat similar problem in the handling of impounded merchandise. From time to time every packer has occasional lots of merchandise that leave his factory and he finds out later that quality problems have developed. This requires an impounding procedure whereby that merchandise must be withheld from shipment until the quality control personnel from the packer have had a chance to appraise it carefully and in many cases ship it back to the plant for disposition. Nothing irritates a packer's organization so much as to find some merchandise that has been impounded is no longer on hand but has been shipped out carelessly after the impounding instructions have been received. The serious consequences of this type of error do not need to be amplified. However, to make the point clearly, I think you know that we in Minute Maid believe it costs us somewhere between $2 and $3 to obtain a new customer for our product. We can lose that customer, never to be regained, if he or she gets a poor can of juice. A mistake of shipping ten cases of impounded juice could amount to 500 customers lost forever, or an out-of-pocket cost to Minute Maid of between $1,000 and $1,500, and this on a mere 10 cases.

To continue with what the packer has the right to expect of the warehouseman, I would say the next important thing is prompt and cheerful service right from the top people down through the men on the platforms. This service implies the rapid loading and unloading of cars and trucks, the alert and accurate processing of paper work with a full report on all exceptions that they run into, and the proper attention to requests for extra services such as inventories, bills of lading, stencilling, etc. The packer also expects that the packer's customers will be treated with the same courtesy and respect with which the warehouseman treats his own best customers.

The packer looks for a vigilance, good housekeeping in order to minimize damages and losses of the merchandise stored in the warehouse. Careless operation of lift trucks, cluttered aisles, poor stacking, and all of the other things that are far more obvious to you experts all tend to increase the packer's costs of doing business and come out of his profit dollar.

On the matter of cost, I think the warehouseman must be expected to keep his plant and equipment modern and be constantly searching for the latest developments in refrigeration and materials handling so that his costs can be reduced and these reductions passed along in reduced rates to the packer. With the bright searchlight of cost investigations going on in every packer's organization today, I think I can promise that every well-run frozen food company is going to be more concerned from here on out than they ever have been on their cost of storage. It behooves the warehouseman, therefore, to get his costs down and pass these savings on to the packer.

And finally, of course, the packer hopes that the warehouseman will

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Notes on address at luncheon meeting sponsored by National Association of Refrigerated Warehouses at Frozen Food Convention.

continue to expand and keep his building program in line with the needs and demands of the packer's operation. I think with the exception of a few tight sections in the country, the warehousemen have done an exemplary job on this, which is really the risk-taking side of the business.

What the Warehouseman Expects

Now, what does the warehouseman have the right to expect of the packer? First, of course, I think he deserves a fair return for the services he renders. My references above to making reduced rates available when cost savings were found did not imply cheap rates. Whenever a rate cut impairs the quality of services, I don't think anyone benefits. The warehouseman should also expect prompt payment of his bills when he renders them. The warehouseman, I have been told, is something like the doctor in that he is the last man paid. I trust this is not true in the case of Minute Maid.

The warehouseman I believe is entitled to complete advance information on the incoming and outgoing movements of the packer's stock. He should not be surprised with a crisis a week and made to turn his organization on its ear in order to accommodate the poor planning of the packer's traffic department. The warehouseman should expect the packer to make every effort to package his product in sizes and in cartons and in weights which lend themselves to efficient and easy handling.

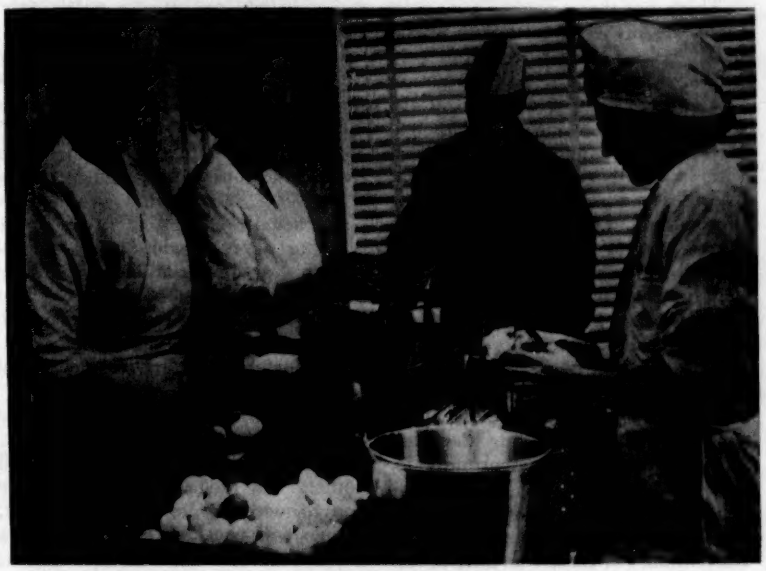
The warehouseman should expect fair payment for all of the extra services where they are demanded, such as inventory-taking, separation of codes, double and sometime multiple handling of goods, etc. In other words, where a packer requires special treatment he should expect to be billed for such services. Finally, the warehouseman and his help are due all the normal courtesies from the packer.

Role of the Warehouse

The role of the frozen or refrigerator warehouseman has been changing gradually but steadily in the last decade. From biblical times the warehouseman's role had always been to store the surpluses that were accumulated during the harvest season so that these products could be consumed during the periods when Mother Nature does not supply them. However, in the last ten years the warehouse has become the vital link in the chain between the producer and the consumer.

Wisconsin Plant Handles High Grade Refrigerated Broken Eggs

FURNISHING broken eggs, thoroughly refrigerated, to bakers, hotels and restaurants is a specialty of the Watertown Egg Company, Milwaukee, Wisc. This business has been carried on by this concern for over 30 years. Other lines included are egg processing of all kinds, except powdered eggs, fine shell eggs, frozen fruit, the latter in institutional size only.



Women breaking eggs in Watertown egg-breaking plant, Max Shimon, owner, looking on.—Milwaukee Journal Photo.

The company breaks about 250,000 eggs a day, the majority going to Milwaukee bakeries, with about 100,000 being sold to hotels, restaurants and food stores.

Eggs Cooled and Frozen

Eggs in the shell are cooled at 45 F., while the broken eggs are frozen at 10 below zero. The canned eggs are kept in storage over night at 30 F. When necessary to store eggs for a longer time, the shell eggs are kept not more than two or three days, while the frozen product is sometimes kept for about 90 days.

This is strictly a Grade A business, according to the owner of the company, Max Shimon, and quality control is one of his hobbies.

It is claimed that this is the only egg breaking plant in Wisconsin of any size. The refrigerating machinery consists of three 10 hp. Vilter ammonia compressors. After being homogenized, the product is stored in 30-pound cans, which are piled in a certain way in the freezer. They are pyramided, not stacked one on top of another, so that there is proper refrigeration all the way through. The product in cans is kept in the cooler for 72 hours, after which time a hole is drilled through the center of the frozen product, and sniffed. An expert can tell in a moment if the least bit of offensive odor is present. If any, that can is removed at once.

Baking Trade Supplied

Mr. Shimon says he has worked up a business in this line amounting to about $400,000 per year, of which about 15 percent covers frozen fruits, such as strawberries, cherries, raspberries, apples and blueberries, all supplied to the baking trade. Before they are dropped into a can, the broken eggs are sniffed carefully, this being done after the eggs have passed the candling test.

Yakima Cold Storage Sold

SALE OF the Stubbs Fruit and cold Storage, Yakima, Wash., to William L. Burns of Yakima has been announced by Frank F. Stubbs. Purchase price was not disclosed. No changes are planned and present personnel will be retained, the new owner stated.

The Annual Ice Convention — Travel and Hotel Information

IT'S NOW, time to start making plans for the 1955 National Ice Convention, says a recent issue of NAII Ice News. The Convention will be held at the Biltmore Hotel, Los Angeles, November 15-18, 1955.

There are three good reasons why plans should be made now to attend this Convention, the Ice News continues. First, the 1955 convention will be great! No iceman can afford to miss it! The business sessions will be interesting and they will be packed with facts and valuable information. They'll be devoted to the making, processing and selling of Ice — more Ice — and to making more money from it.

In putting the program together, full use will be made of the Industry's most progressive and successful Icemen. Many of these Icemen are located on the Pacific Coast. They operate highly modernized ice properties which those attending the convention will have an opportunity to visit.

Secondly, Los Angeles is a great place in which to hold a National Convention. For those who have never been there, or for those who have not been there for years, it's the experience of a lifetime. Los Angeles is glamorous and world-famed. It is well known for its national broadcasting and telecasting studios where world-renowned celebrities entertain over the air waves almost around the clock. It's the movie capital of the world. It has industry; it has beaches; it has mountains. It has Hollywood and Vine. It has everything! And in planning the convention program, full use will be made of this setting and its resources to provide top entertainment for conventioners and their families.

A Vacation Trip

Finally, because of all the family vacation opportunities on the West Coast, beyond the Coast line, and enroute to and from the convention, you'll be missing a bet if you don't think about your family's vacation as a part of the convention and vice versa.

People really get a break on family travel to the West Coast. The air lines and the railroads have family plans to the Coast. By plane, if you buy two one-way fares for yourself, your wife can accompanying you on the round trip for a one-way fare.

The railroads offer family rates on certain days of the week for most of the country, too. When the husband buys a round trip to the West Coast he can take his wife with him for a one-way fare. Children 12 to 22 make the round trip at the wife's rate; children 5 to 12 at half of one-way fare; and children under 5, free.

Along the famous "Strip," located on the edge of Las Vegas, is an archlighted "Boulevard of Dreams" stretching for five miles. Here are the luxurious resort hotels whose grandeur and vastness cannot be matched by any place in the world. Living at reasonable prices amidst plush accommodations, sparkling pools, green patios and nightly floor shows will appeal to many. In addition, there's golfing, fishing, boating, horseback riding, casinos, night clubs, and on and on and on.

Some will want to include the Grand Canyon in their itinerary, others Carlsbad Caverns, while still others will be happy to concentrate on the elegance of California itself. Some will consider Palm Springs a "must," others will include Denver, Salt Lake City, Portland, Seattle, Phoenix or Cheyenne.

And, some will seize this opportunity to combine the convention trip with a visit to Mexico or to colorful Hawaii, to say nothing of the possibilities of a visit to Vancouver and Victoria in British Columbia, returning by way of Banff and Lake Louise.

Those who are pressed for time may be able to combine air and rail travel to advantage. The quickest transportation, of course, is by air. On the other hand, there may be areas that you will want to see at ground level. If so, you may be able to combine the two types of transportation. If you live in the Southeast, you might choose to fly to New Orleans, make the western part of the trip by train, and fly home from New Orleans on the return trip.

Many ice people from all parts of the country are planning to drive to California for the convention. This is a wonderful trip, and a fine way to see the country and to visit the places chosen.

The Hotel

The convention hotel — The Biltmore — is the largest and finest hotel in Western America. It's luxurious and its rates are reasonable. All will be pleased with its plush accommodations. It has 1500 guest rooms, each with private bath, arranged in single or double rooms, or any way you like.

Guest conveniences include four distinctively different restaurants, delightfully varied to satisfy every taste, four unusual and intimate cocktail lounges, the fashionable Biltmore Bowl, the fabulous Rendezvous, a unique "Nite Club in the Afternoon". The hotel contains a smart shopping center, a fine art show and an exclusive men's club and plunge. It has its own garage but surrounding the Big Biltmore Block is parking space for more than 4000 cars — all inside space.

Entertainment

The Dinner-Dance of the convention will be held in the famous Biltmore Bowl, where cafe society dances nightly to the music of big-name orchestras, where headline entertainers perform in gala revues, where every table is "ring side". This kind of entertainment, plus glamour, gaiety, elegant food, and a fitting background will insure all of a perfect evening.

Conscientious Objectors Test Irradiated Food

NINE conscientious objectors are eating food treated with atomic radiation so American soldiers of the future may not have to battle the traditional tin can. At Fitzsimons Army Hospital, Denver, Colo. they are experimenting to see how much nutrition is retained in food when it is preserved with radiation instead of stored in cans.

Maj. Gen. M. E. Griffin, Fitzsimons commandant, joined the nine volunteers in their first such meal with Lt. Col. Carl J. Koehn, head of the medical nutritional laboratory. A hospital spokesman said there is no danger in eating the foods.

In Washington, Maj. Gen K. F. Hertford, chief of Army research, said the radiation may preserve a greater variety of foods "with far better taste and texture than available from conventional methods." Atomic radiation, he said, may increase the potential for servicemen by permitting use of highly perishable foods now avoided for want of refrigeration facilities.

NOTE: In another article in this issue, the TRRF Bulletin is quoted as pointing out that irradiation of foods as a means of preservation has not been established on an acceptable technical basis.

Overproduction of Ammonia?

SOME financial men are quite concerned over the way meat packers, tractor makers, distillers, even investment trusts are rushing to get into the chemical business, says Forbes Magazine. Anhydrous ammonia, used mainly for fertilizer is a case in point, it continues. At one time it looked as though the nation would never have enough. Then so many companies rushed in to build new plants that Washington began turning thumbs down on applicants for certificates of necessity. Enough plants are now in blueprint to raise capacity from 2.8 million to 4.3-million tons capacity by 1956. "Will the markets," asked Chemical Week recently, "be broad and deep enough to absorb the impending flood?" The influential trade journal quickly supplied its own slightly worried answer: "Ammonia sellers are certain to be soon saddled with surpluses—if planned anhydrous units spew forth rated capacities."

Plan New Plants

Despite such somber warnings, a long, impressive list of smart managements continue to plan new ammonia plants: Sun Oil, U.S. Steel, Standard Oil of Indiana, Atlantic Refining, to name just a few. For one thing, ammonia boosters think that industrial uses in nylon, orlon, plastics and other products will take up part of the slack. W. R. Grace, for example, sells nitrogen, hydrogen and carbon dioxide from its big new Memphis ammonia plant to a nearby duPont unit. In addition, the optimists expect that the steady increase in hungry mouths to feed will take care of the rest.

It is one of the peculiarities of the chemical business that the chemical optimists and the skeptics both are probably right, Forbes continues.

Provide Supply First

Unquestionably the market would at first refuse to absorb all the projected production. But chemical men are used to thinking in somewhat unorthodox economic terms. They do not, generally speaking, agree with the businessman who builds only when demand has already outstripped supply.

Chemical planners are used to providing the supply first, then waiting confidently, and inventing ways for demand to catch up. "It is," Dow's President Leland Doan once commented, "a little like buying your winter fuel in the summer. You don't need it then, but you know you will."

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United's patented BB (block baked) Corkboard installs easier and stays on the job! High strength in relation to light weight permits a sturdy, self supporting structure that is simple to erect. United's corkboard is flexible; the big straight-edged slabs fit accurately and work as easily as lumber. Most important, there is adequate flexibility to conform to minor wall irregularities and absorb stresses. *You get a tight fit that stays tight . . .* that prevents creation of moisture-carrying channels which can eventually destroy the insulation value of your installation.

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Basic Electrical Controls For Refrigeration Systems

HOWARD WOLFBERG, Engineer
Central District, York Corp.
Chicago, Ill.

First of two articles on understanding electric controls most essential to industrial and large commercial refrigeration installations, this paper by Howard Wolfberg deals with types of electrical service, elements of full voltage magnetic motor starter, and protective devices. Reading and understanding basic control wiring diagrams is the subject of the second paper by Mr. Wolfberg, to appear in the August issue. These articles were prepared in response to many requests of NAPRE's Educational Committee for basic instruction articles on electric control circuits, an "alien" field to most practical refrigeration men and especially young men just entering the game. Mr. Wolfberg presented these talks before the Chicago Chapter, NAPRE.

TYPE of electrical service furnished to a building by a power company is determined by the needs of the customer and selected to suit an overall pattern of electrical distribution of the power company. The simplest type of electrical service is a supply of 120-volt, single phase, 60-cycle current for the primary purpose of providing lighting.* Fig. 1 illustrates a typical electrical circuit consisting of a snap or toggle switch, and a light bulb. Fig. 1-(a) indicates the toggle switch open, resulting in an open or broken circuit with the light off. Fig. 1-(b) indicates the toggle switch closed and the light lit. For the sake of simplicity, these circuits are shown without fuses and with only the minimum amount of electrical equipment which can be involved.

In the more general case, a 240/-120-volt, single phase, 60-cycle, three-wire service is used to satisfy the lighting requirements of a building. Fig. 2 illustrates in schematic form an electrical distribution system of this type within a residence and shows three separate electrical circuits. Two of these circuits each utilize one of the hot wires and the neutral wire to provide 120 volts for lighting. The third circuit uses only both hot wires to provide 240 volts for a kitchen range. Note that a two-pole toggle or disconnect switch is used to open each hot wire leading to the range.

*Due to the limited use of direct current today, only alternating current electricity will be considered in any of the following material.

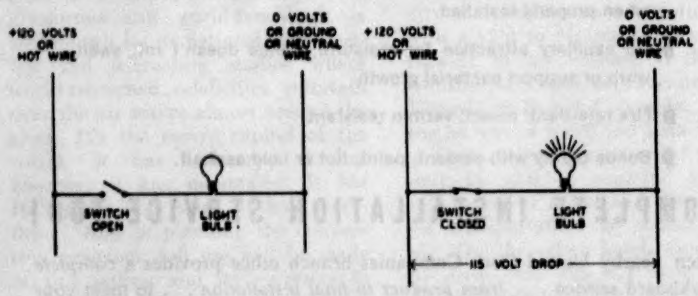

Fig. 1—Basic 2-wire lighting circuits utilized by the author as wiring fundamentals common to some control circuits: (a), open lighting circuit; (b), closed.

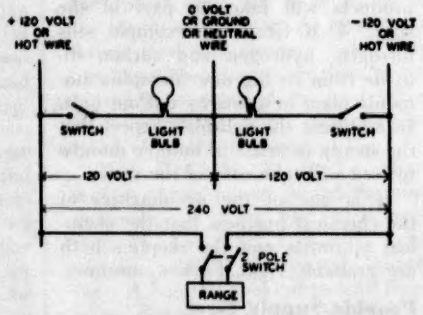

Fig. 2—Three-wire, 240 volt, circuit for lighting and residence utility power.

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Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., an educational association, "not-for-profit".

Electric Power Distribution

Three-phase current is used to power virtually all industrial electric motors over ½ hp size because of their greater efficiency in design and operation over single-phase motors. In addition, 3-phase power transmission is more efficient than single-phase power transmission.

A 220-volt, 3-phase, 60-cycle electrical service is often furnished by power companies to industrial or commercial buildings to operate their motors. Fig. 3 illustrates the relationship in voltage between each of the three wires of this three-phase system. In this case, each wire differs in voltage from each other wire by 220 volts, and the relationship is single phase between any two wires. Two conventional light bulbs, wired in series and connected across any two of the three wires would light up, and there would be voltage drop of 110 volts across each bulb, for a total of 220 volts as indicated in Fig. 3.

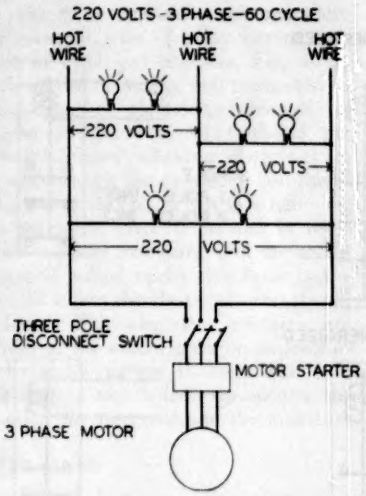

Fig. 3—Typical 3-wire, 3-phase, 220 volt system for commercial power and lighting.

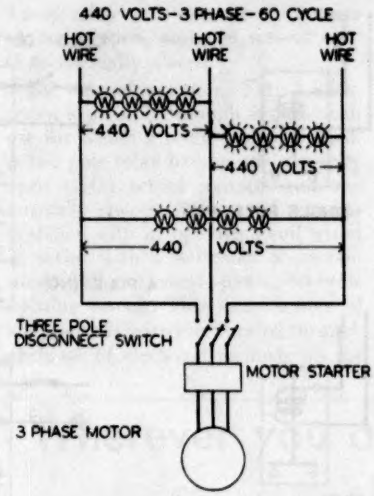

Fig. 4—Another 60-cycle commercial type of electric service; 440 volt 3-wire, 3-phase.

Popular Commercial Service In Four-wire, Three-phase

Another type of electrical service which has wide and increasing usage is the 208/120-volt, 3-phase, 60-cycle, four-wire system. This single service is capable of satisfying both the lighting and power requirements of a building.

This system utilizes three hot wires, and one grounded or neutral wire. The three hot wires differ from each other by 208 volts and the relation is single phase between any two of these wires. Each of the hot wires differs with the grounded or neutral wire by 120 volts, single phase. Note from Fig. 5 that the grounded or neutral wire is only carried over to the lighting circuits, and that a lighting circuit is completed when connected across any one of the three hot wires and the ground, or neutral wire.

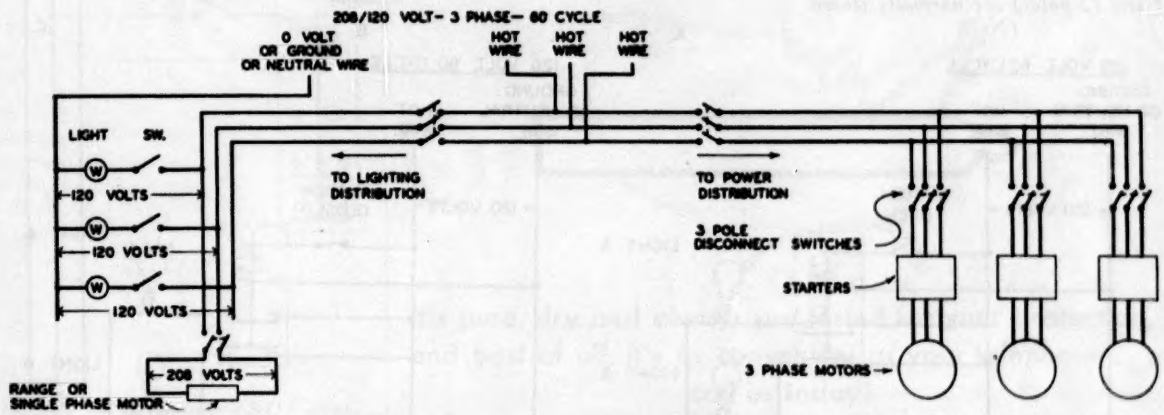

Fig. 5 — Popular 4-wire 60-cycle electric service for commercial and industrial establishments provides 120-volt lighting; 208-volt, single-phase power for motors, ranges, etc; and 208-volt, 3-phase, for heavier duty power uses.

Another common power service is a 440-volt, 3-phase, 60-cycle, three-wire system. The only difference between this and the 220-volt, 3-phase, 60-cycle system is that each wire differs in voltage from each other wire by 440 volts. Fig. 4 indicates four conventional light bulbs connected in series across each pair of wires. There is a 110-volt drop across each bulb and a total of 440 volts for all four connected in series. Other variations in power services include 240-volt, 480-volt, and 550-volt, 3 phase, 60-cycle systems. Two-phase systems, and 50- or 25-cycle systems, once fairly popular, are little used today.

Whenever a building is served by one of the previous mentioned power services, it is usually also independently served by the 240/120-volt, single phase, 60-cycle, three-wire service. This latter service handles the lighting load and generally the small, fractional horsepower motor loads.

The majority of three phase motors manufactured today are of the dual voltage type for use primarily

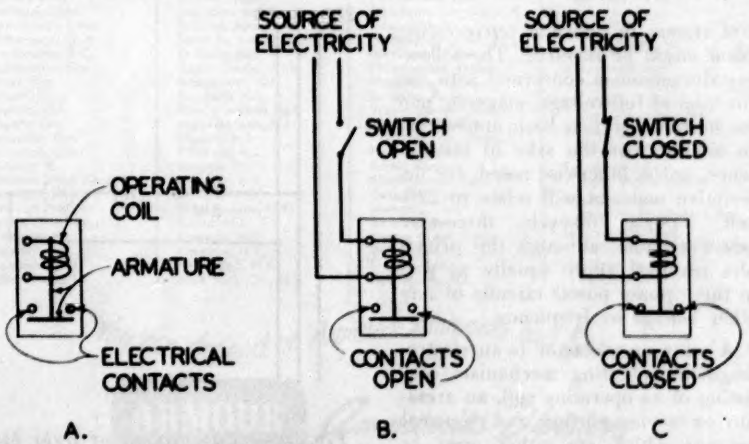

Fig. 6 — Illustration of common coil or solenoid switch: (a) principal parts; (b) wired for service; and, (c) in service.

on 220-volt or 440-volt, 3-phase, 60-cycle circuits. These motors can also be used on 208- 240- or 480-volt, 3-phase, 60-cycle circuits, although motors wound specifically for these voltages are also available.

Three phase motors are used almost exclusively to operate compressors, fans, pumps and other equipment comprising industrial or large commercial refrigeration installations. *Operation of the starters controlling these motors is usually the most important element of any automatic control system in which a refrigeration plant might be involved.* The following discussion is concerned with the function of full-voltage, magnetic motor starters and their basic application to motors. For the sake of convenience, unless otherwise noted, the descriptive material will relate to 220-volt, 3-phase, 60-cycle, three-wire power circuits, although the principles involved apply equally as well to three phase power circuits of any other voltage or frequency.

A relay or contactor is an electromagnetic operating mechanism consisting of an operating coil, an armature or moving portion, and electrical contacts which are either open or closed, depending on the position of the armature.

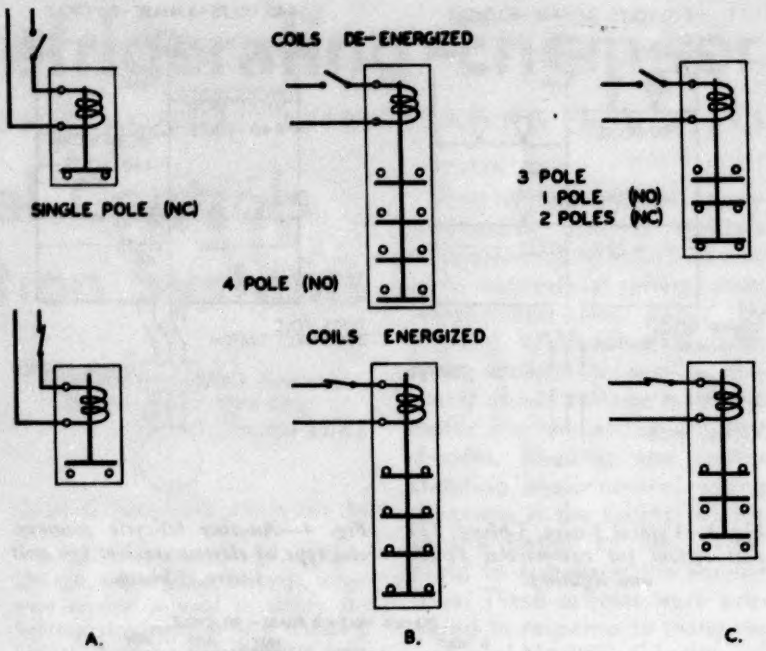

Fig. 7 — (Right) Types of control coils and their operating designations: (a) single pole, normally open; (b) 4-pole, normally open; and (c) 3-pole combination where one set or pair of contacts, (1-pole) is normally open (NO), and other 2 sets (2-poles) are normally closed (NC).

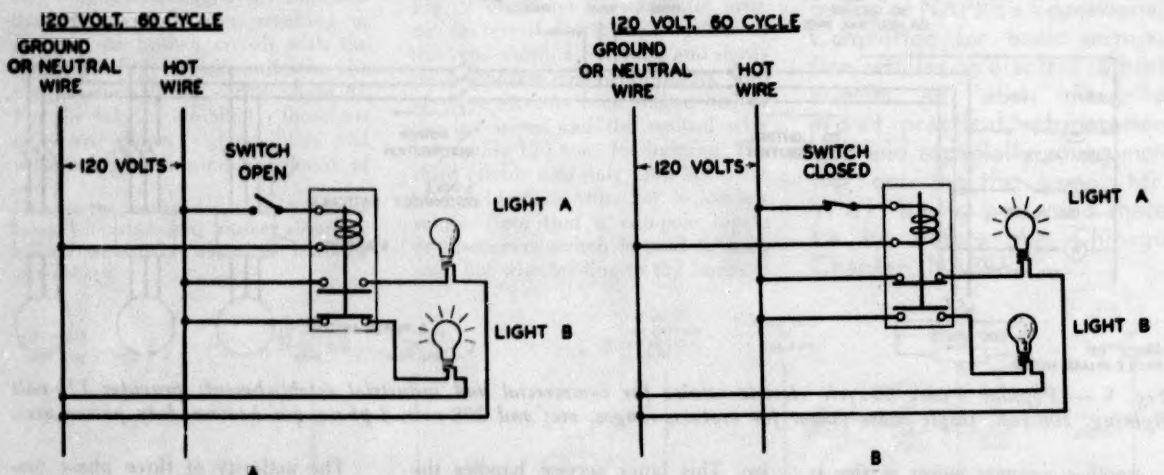

Fig. 8 — A somewhat impractical application, but nevertheless a good illustration of a combination relay utilizing both normally closed (NC) and normally open (NO) poles; (a) control circuit open; (b) control relay energized.

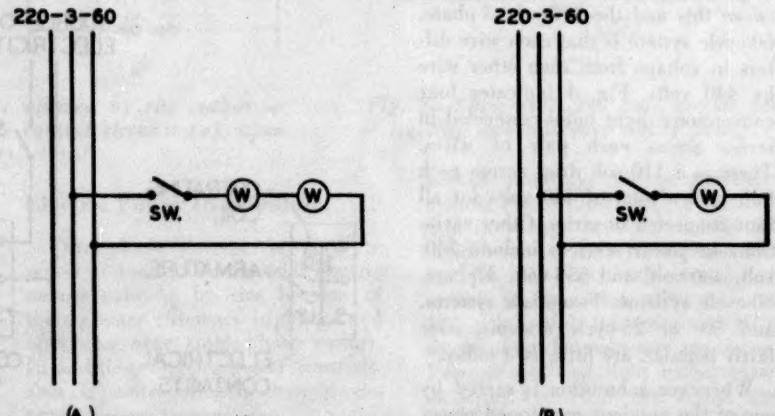

Fig. 9 — Comparison of light bulb book up with conventional 110-volt bulbs in series (a), and special 220-volt bulb (b). Relays may be wired up similarly.

Fig 6(a) represents schematically a solenoid type of relay having one set of electrical contacts. Fig. 6(b) shows the operating coil connected to a source of electricity through an open switch. Fig. 6(c) shows the switch closed allowing electricity to pass through the operating coil thereby energizing it. When this happens, a magnetic force is created between the coil and armature, and the armature is pulled up by this force to the point where the electrical contacts are closed. The electrical contacts are held in the closed position as long as electricity passes through the coil. When the switch is again opened, the coil is de-energized and the armature

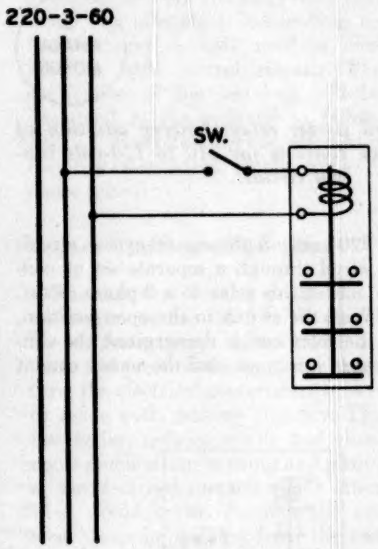

Fig. 10 — Three-pole (NO) relay.

drops down; thereby opening the electrical contacts.

The relay previously described is known as a single pole relay with *normally open* (NO) contacts. The single pole indicates only one set of electrical contacts, and the normally open (NO) indicate that these *contacts are open when the operating coil is de-energized* (the relay is in the normal position). Relays can be obtained with any variety of number of poles or sets of contacts, and these contacts may be either the normally open (NO) type previously described, or the normally closed (NC) type. A *normally closed* (NC) set of electrical contacts is *closed when the operating coil of the relay is de-energized* (the relay is in the normal position). These contacts open when the relay is energized.

Fig. 7(a) illustrates a single pole relay with normally closed contacts; Fig. 7(b) a 4-pole relay with normally open contacts; and Fig. 7(c) a 3-pole relay with one set of contacts normally open, and two sets of contacts normally closed.

By way of example, Fig. 8 illustrates a possible, though impractical, use for which a relay might be used. A two pole relay having one normally open (NO) set of contacts and one normally closed (NC) set of contacts is shown with its operating coil wired in series with a switch to a conventional 120-volt, single-phase, 60-cycle lighting circuit. This same source of electricity is wired in parallel through each set of electrical contacts on the relay to lights A and B. With the switch open, as indicated in Fig. 8 (a), the relay operating coil is de-energized, and the normally closed set of contacts cause only light B to shine. When the switch is closed, as indicated in Fig. 8(b), the relay operating coil is energized, and the normally open set of contacts are closed causing only light A to shine.

Conventional Practices

Conventional wiring diagrams show relay contacts only in the position they assume when the relay operating

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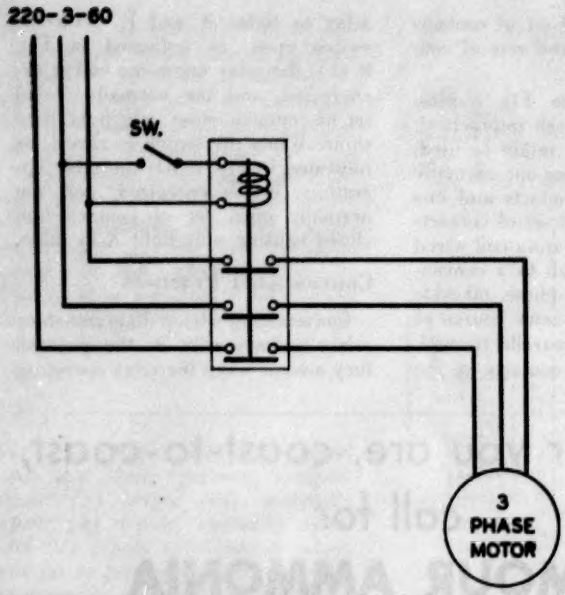

Fig. 11 — Same 3-pole relay shown in Fig. 10, wired for motor starting service. Three heavy-duty poles carry power current at 208-, 220-, or 440-volt.

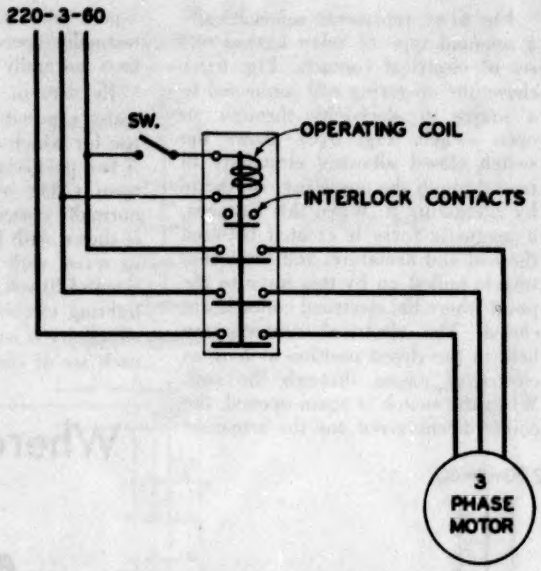

Fig. 12 — Standard starter relay showing addition of light—duty interlock contacts for 110 to 120-volt control circuits.

coil is de-energized. In other words, *normally open contacts are always shown open* and *normally closed contacts are always shown closed.* The same convention will be followed for the remainder of the material to follow.

wired in place of the light. Fig. 10 shows a 3-pole relay with normally open contacts wired in this manner. Closing of the switch will energize the relay and close the three sets of contacts. Fig. 11 shows each wire of the 220-volt, 3-phase, 60-cycle circuit wired through a separate set of contacts of this relay to a 3-phase motor. With the switch in the open position, the relay coil is deenergized, the contacts are open, and the motor cannot

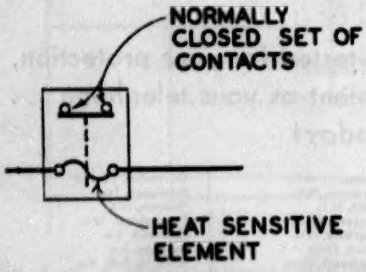

Fig. 13 — Schematic of thermal overload relay employed in motor starter control circuits.

As described earlier, the difference in voltage between any two wires in a 220-volt, 3-phase, 60-cycle system is 220 volts, single-phase. Fig. 9(a) shows two standard 120-volt light bulbs connected in series with a switch across two wires of a 220-volt, 3-phase, 60-cycle circuit. When the switch closes, the lights will operate at an intensity slightly below normal since there will be only a 110-volt drop across each bulb. Fig. 9(b) indicates a light designed for 220 volts. Closing of the switch will cause the light to operate at its proper intensity.

A relay operating coil designed for 220 volts could be substituted and

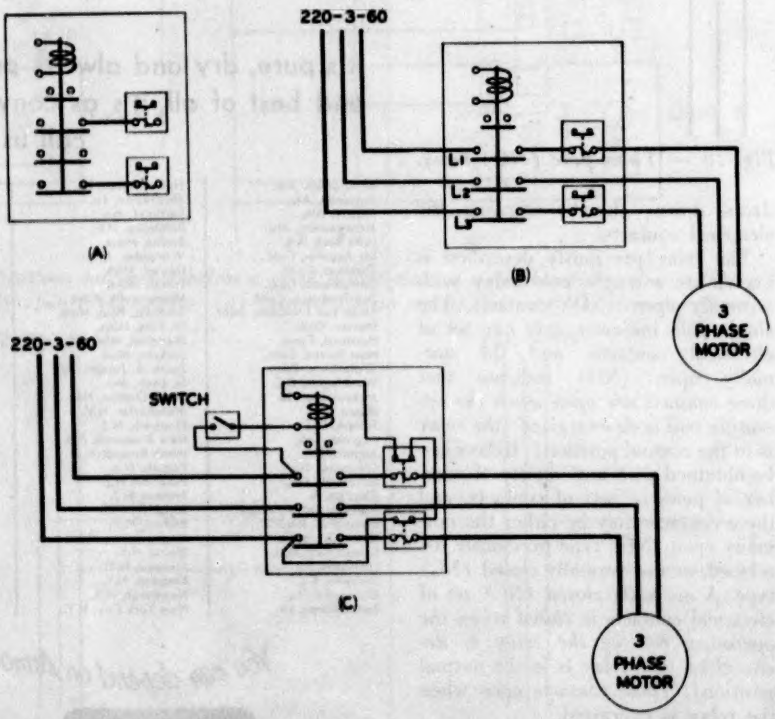

Fig. 14 — Evolution of an an across-the-line push-button motor starter with thermal overload safety features: (a) schematic of control box; (b) line wiring added; and (c), thermal cut-outs wired in series with starter switch and pull-in coil.

operate. Closing the switch energized the relay which closes the electrical contacts and permits the motor to operate.

The most important single component of a magnetic, full voltage motor starter is a heavy duty relay of special construction which is designed for frequent and repeated operation, which is known as a contactor. Standard starters have contactors with four pair of poles or sets of contacts, all of which are normally open. Three of these pole pairs are of the proper size to handle the current of the 3-phase motor to which the starter is applied. The fourth pair is generally of a smaller size capable of handling a maximum of 10 amperes. This smaller set of contacts is known as an *interlock* and is only used in conjunction with control circuits. The application of the interlock will be explained in the material to follow. Fig. 12 illustrates the contactor of a motor starter wired to control a 3-phase motor.

Starter Contactor Functions

The function of the contactor in the starter is two-fold. First, due to the electro-magnetic forces which actuate and position the contactor armature, the electrical contacts are broken or made with extreme rapidity. This fast action reduces arcing and eliminates much of the burning and pitting of the electrical contacts which otherwise would occur. Second, the coil switch can be isolated from the contactor which it controls. The only current passing through the switch is that necessary to energize the operating coil. The larger amounts of current required by the motor pass only through the motor power poles of the contactor. In this way, the operator is separated from the switching action controlling the motor operation. For example, a typical 100 hp, 220-volt, 3-phase, 60-cycle motor draws a continuous current at full load of approximately 240 amperes and a brief initial starting inrush current of 1450 amperes in each of the three wires feeding the motor. The operating coil of the size 5 starter required to control this motor draws a continuous current of approximately 2 amperes and a momentary initial inrush current of approximately 20 amperes.

Other important components of a motor starter are the overload relays, the function of which is to disconnect the motor from the electrical supply when the motor is in danger of overheating. In this case, overheating would be the result of the motor drawing currents in excess of that for which it was designed. Thermal and magnetic overload relays are commonly used for this purpose, with the thermal overload relay being the more popular type. Fig. 13 is a schematic representation of the thermal overload relay. The heat sensitive element is connected across one of the power wires feeding electricity to the motor. If this wire should pass more current than that allowed for by the motor design, the heat sensitive element will cause the normally closed set of contacts with which it is mechanically linked, to open. This normally closed set of contacts is designed for incorporation only in a low current, control circuit and is independent of the power wire feeding large current to the motor.

If the normally closed set of contacts should ever open, they cannot automatically close again. In this case, they must be manually reset to their closed position by depressing a special push button, which is incorporated with the overload relay for this purpose.

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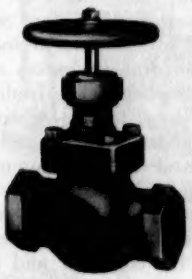

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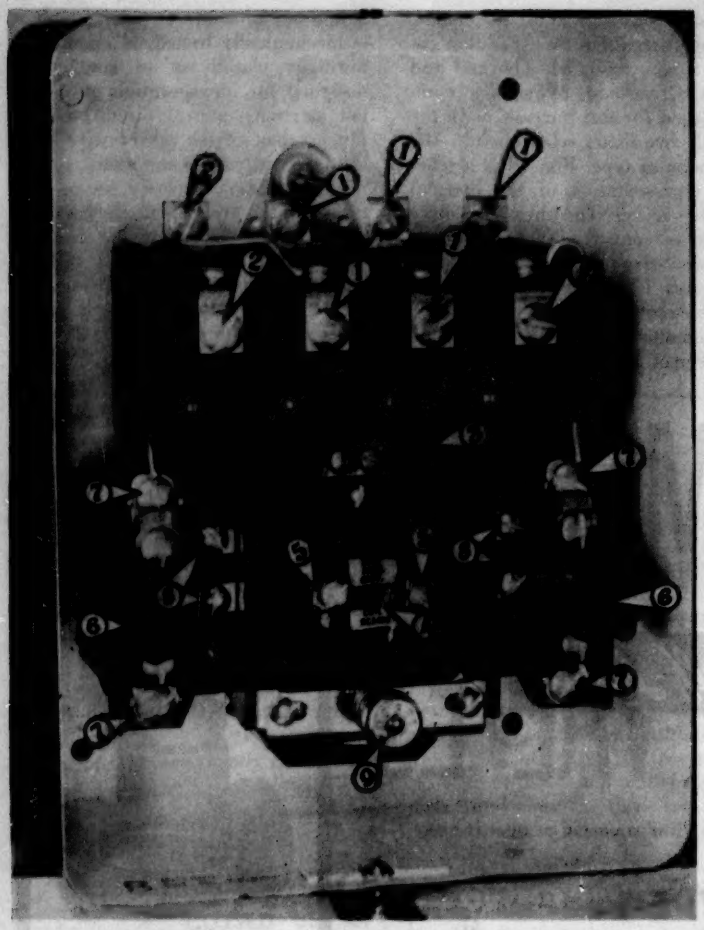


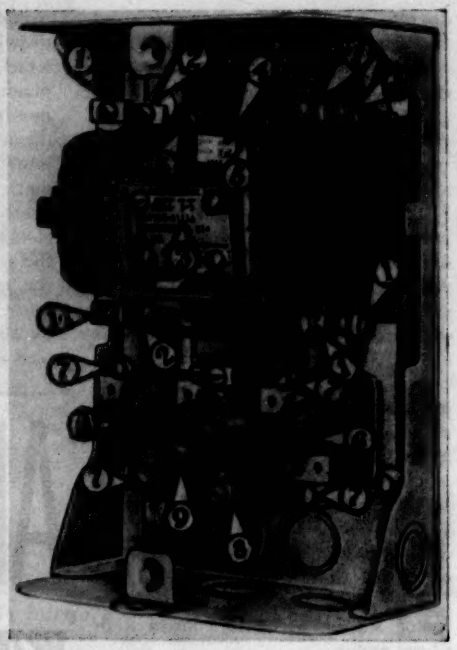


Fig. 15 (Left) Allen-Bradley Starter with components identified as follows: 1 — Power pole terminals. 2 — Interlock terminals. 3 — Solenoid type armature. 4 — Operating coil. 5 — Operating coil terminals. 6 — Overload heater. 7 — Overload heater terminals. 8 — Overload relay control circuit terminals. 9 — Reset button for overload relays.

Fig. 16 (Above) Cutler-Hammer Starter showing same basic devices arranged as selected by this manufacturer: 1 — Power pole terminals. 2 — Interlock terminals. 3 — Clapper type armature. 4 — Operating coil. 5 — Operating coil terminals. 6 — Overload heater. 7 — Overload heater terminals. 8 — Overload relay control circuit terminals (top and bottom). 9 — Reset button for overload relays.

Overload Relay Functions

Fig. 14 is a schematic representation of a typical full voltage, magnetic starter, consisting of a contactor, two overload relays, and an enclosure. Two overload relays are usually considered sufficient to protect the motor from drawing excess currents in all three power wires feeding it. Fig. 14(b) shows the power wiring to the motor and starter. Fig. 14(c) shows the control circuit wiring of the starter added. Note that the normally closed contacts of each overload relay are wired in series with the operating coil of the contactor and the switch which controls it. If either or both of the normally closed overload contacts should open up, due to excessive current drawn through the power wires while the motor is in operation, the control circuit will be broken and the operating coil of the contactor will be deenergized. This will stop the motor, and the motor will not be able to start again until the manual reset button for the overloads is depressed.

(Continued on Page 56)

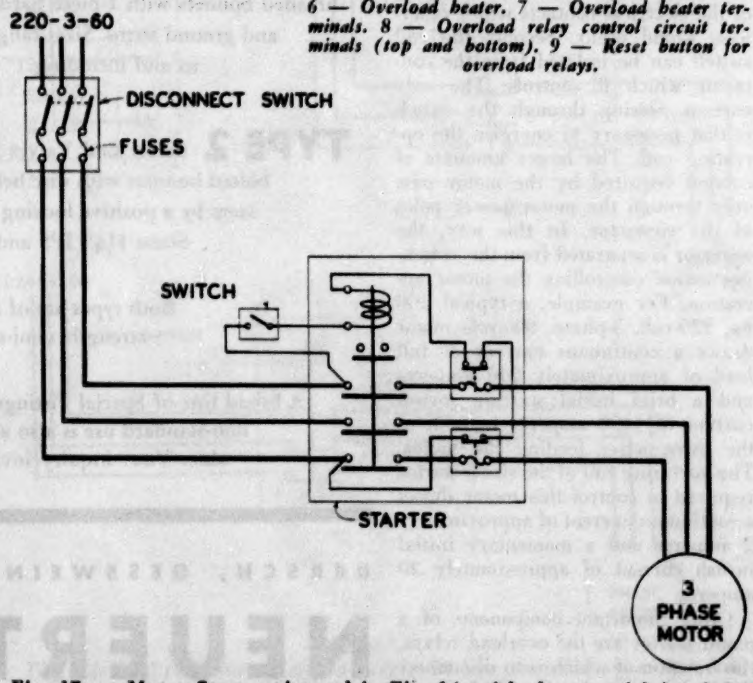


Fig. 17 — Motor Starter pictured in Fig. 14, with the essential fused disconnect switch added between power supply (line) and starter in the motor circuit (load).

News Notes and Chapter Activities

Detroit

BILL EUTH

FIFTY-EIGHT members of Michigan Chapter No. 1, NAPRE, visited the home plant of The Dow Chemical Company, Midland, Michigan on May 14, 1955.

The visit, part of the chapter's educational program to learn about new and improved products of interest to the refrigeration industry, included luncheon in the company's cafeteria, movies on Dow and Styrofoam, Dow's expanded polystyrene plastic used for low temperature insulation, and a tour of the vast Dow plant.

Several officers of this Michigan chapter of NAPRE participated in the day's activities. They included R. T. Burns, chairman of the board and also a national director of the Association; L. L. Adams, secretary; J. C. Rehard, member of educational committee, and former chief staff engineer, City of Detroit; L. V. Bedard, first vice-president; and J. K. Rawsthorne, chairman of educational committee. W. S. Schock of Dow's plastics sales department handled arrangements for the visit and welcomed the group to Midland.

At our regular meeting on Thursday, May 26, feature of the meeting was a lecture by J. T. Maloney of Acme Industries, Inc., Jackson, Michigan. Mr. Maloney discussed cooling towers and evaporative condensers; their care, maintenance and operation. He tackled, not only the problem of unit selection and the principal purposes for which these water saving devices are used, but went into practical suggestions on their operation, steps to be taken for their installation, and a short but educational treatise of water treatment. Three informative bulletins were distributed to the members present.

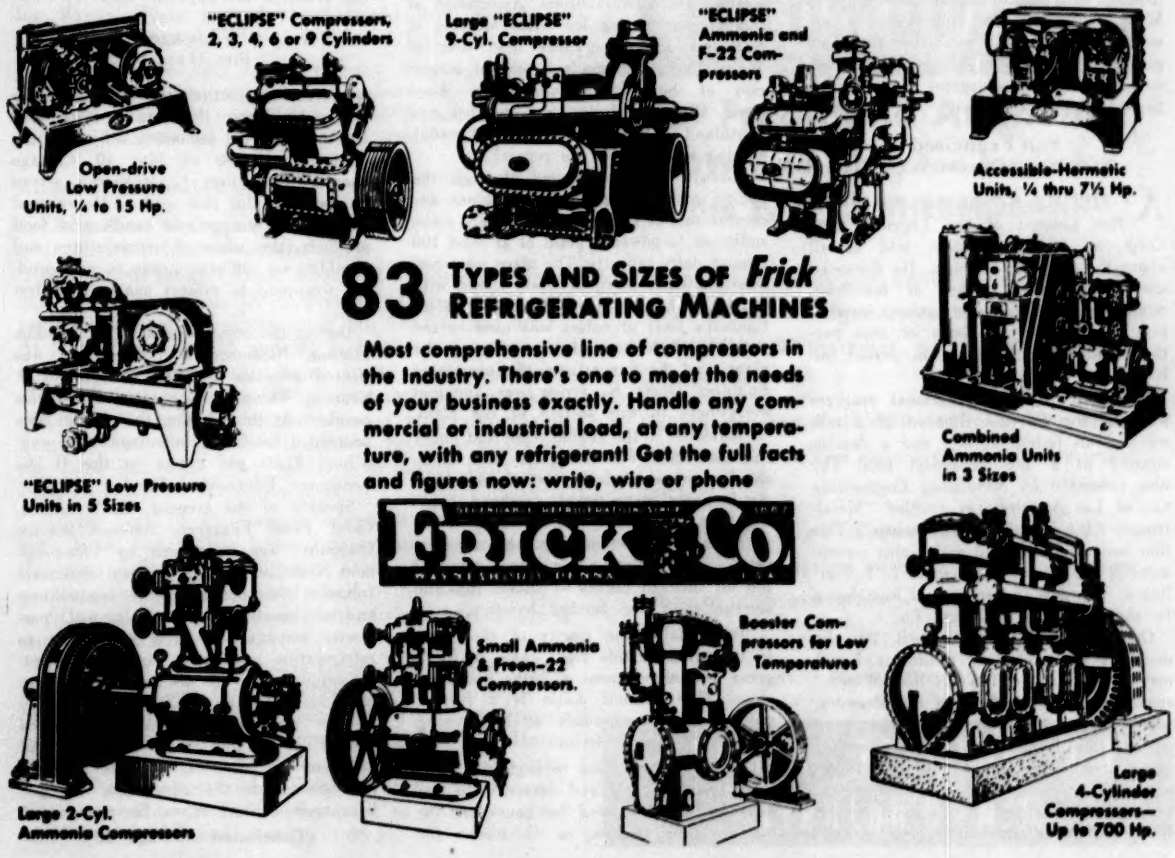
New Orleans

MAX SOFER

THIS SCRIBE earlier announced in the chapter's column that we had a new instructor, one Thomas A. Stokes. Although we indicated we were particularly proud of our new educator, the column failed to cite any of Mr. Thomas' background. This time we are making sure it gets in print by providing a portrait too.

Born and reared in Texas, Thomas Stokes is a chemical engineering graduate

W. S. Schock, Dow, second from left, welcomes R. T. Burns, Chairman of the Board of Michigan Chapter No. 1 and a National Director of NAPRE during recent tour of Dow's Midland, Michigan plant. Other officers of the visiting group included, left to right, L. L. Adams, J. C. Rehard, L. V. Bedard and J. K. Rawsthorne.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of Texas Technical College, 1934. He spent two years with Frigidaire in air conditioning after completing the two year course at Dayton. For seven years he helped the late F.D.R. rebuild the District of Columbia (as his associates put it) as a construction superintendent and mechanical engineer for Mehring & Hanson Co.

Thomas A. Stokes

In 1944 Uncle Sam called on him for his services until 1946, during which period he served as a commissioned officer in the United States Navy. On his release from Navy duty he joined our own member Cary B. Gamble and his Associates, as a consulting and mechanical engineer. In this connection he has been in charge of design and construction of many industrial and commercial plumbing, heating, air conditioning and process jobs. Many visitors to the New Orleans convention last year will remember that Tom pinch-hitted for his boss, who was ill, discussing before the delegates Mr. Gamble's paper on "High Velocity Air Systems".

San Francisco

DICHEN KELMETTE

AT THE March 9 meeting, Big Brother Jim Lessard of the Liquid Freeze Corp., as feature speaker, told us all about the flake ice business. He discussed uses, the various makes of machines, equipment design, construction, installation and service problems of this particular industry. A discussion period followed.

On April 13, the educational program was slightly different. Instead of a talk we had an industrial film and a demonstration of a new industrial tool. The film presented by Metalizing Engineering Co. of Los Angeles was entitled "Metalizing — It's Practical Applications". This film had been reviewed and highly recommended by our own Marshall T. J. Garlinger. The new industrial tool was shown by the Linde Air Products Co.

On Wednesday night, April 20, the members and guests of California No. 1 met in the "Land of the Sky Blue Waters" room on the ninth floor of the Brewery, where beer, sandwiches and pretzels were served. Bob Lukaris, one of our newest active members, of the Brewery Engineering staff, described the Kathabar system which is the largest of its kind in the West. Following this there was a conducted tour of the Brewery and we had an opportunity to see the Kathabar system in operation.

San Francisco went elite in May, changing its meeting place for the first time in a decade. The chapter now meets at "The 450 Club", 450 Market St., San Francisco, 2nd floor, second Mondays. The new location affords an opportunity for the members to get together at dinner at 6:30 pm. at very reasonable prices. Those who are so fortunate as to leave their employment early enough to enjoy a meal with the family, find it very convenient to reach "The 450 Club" at 8:00 pm. in time for the educational program.

The educational meeting on May 9 was a talk by Tom Seitz of the mechanical engineering firm of Sverdup & Parcel. His talk covered the subject of reverse cycle or "heat pump" applications with specific reference to the design of the largest commercial "heat pump" installation in Northern California, recently completed and now in use. The discussion period covered possible use of the now largely wasted heat of compression in industrial plants. This talk and discussion period was undoubtedly one of the most outstanding programs for 1955.

Dallas

JIM GLOVER

BEFORE we go into any chapter report this month we would like to remark how one of our members was handed quite a compliment by the Southwestern Ice Manufacturers' Association at their recent Spring Ice Sales Meeting of managers and supervisors held over at Waco. The group made a tour of inspection of Southland's modernized Waco plant. Obert K. Irvine, our member and Southland's Chief Engineer, was the engineering host. Here's the report:

"Groups were conducted through the engine room, equipped with engines and compressors of various sizes and capacities, sufficient to power a plant of at least 100 tons of daily capacity. The place was spotless and each piece of brass shone with sparkling lustre. The National Safety Council's code of colors was used in the painting throughout the interior of the plant, and the fine artistry of Supervising Engineer Obert K. Irvine was apparent everywhere in this section of the plant.

"Adjacent to the engine room and under the same roof was the giant tank room, the floor of which is kept spotlessly clean. An immense crane travels overhead, hoisting with ease twenty 300 lb. cans of ice in a single lift, immersing the load in a vat of clear blue water, then dumping the lot through curtained chutes into the storage vault for further handling.

"Incidentally, the clarity of the brine in the tanks at this plant came in for a great deal of comment as being unusually clear. This without doubt is a further tribute to the efficiency of Supervising Engineer Obert K. Irvine.

"The ice is handled through the vault with amazing speed and dexterity. In one direction it is carried by conveyors for loading into storage, or to trucks for wholesale deliveries. In another, it is run through a highly efficient scoring machine and passed on for further handling. And to one side a great deal of it is run through a giant size machine, which "processes" the ice into three or four different sizes and delivers it into bags as it comes out of the machine, with the "snow" carried off at the end. The bags are then tied and stacked neatly row upon row, pending delivery to users.

"Beyond this vault was yet another storage room the floor being on a lower level and the height extending the distance of at least three stories. The reconditioning of this room had just been completed and the "cooling down" was just getting under way. This room will soon be used for storage against peak season demands.

"The grounds of the plant occupy an entire city block. The main plant itself, known for half a century as the Geyser Ice Company, was built in the early 1900's by the Anheuser-Busch interests. It underwent a remodeling program in the early 1930's, then suffered a terrific fire about 1943 which caused considerable damage and of course necessitated repairs and remodeling at that time. Then, when Southland took over the plant in 1954 an even more extensive remodeling and modernization program was put into effect. The refrigeration and storage division is still operated as Geyser, but the ice end of the operation is now entirely Southland, and the results of Southland's aggressive modernization and merchandising activities are apparent on every side."

Chicago

BILL O'REILLY

FOOD Preservation, the topic of Chapter 13, BASIC REFRIGERATION by Guy R. King, was the discussion subject of the refrigeration class on May 10. Chicago chapter's own Bert C. McKenna, served as instructor for this session. He covered the physical storage and handling of food products, the effect of temperatures and humidity on different products, and product wrapping to protect against dehydration.

During the business session, O. Rhodius Elofson, Nickerson & Collins Co., was elected associate member, and Harvey J. Krumin, Theis Refrigeration Co., active member. At this meeting the chapter also adopted a resolution unanimously, to contribute $1.00 per capita to the H. G. Venemann Educational Fund.

Speaker of the evening, H. W. Alyea, Chief Field Engineer, Johnson Service Company, was introduced by Vice-president Nicholas Downes, program chairman. Johnson discussed automatic temperature and air conditioning controls, with particular emphasis on their application to refrigeration machinery and equipment. He supplemented his discussion by the use of slides. Although his firm is principally in the pneumatic control field, Alyea seemed to handle the discussion and questions on electrical controls as well. He pointed out the advantages and disadvantages of both types. He was accom-

(Continued on Page 40)

Tests on Frozen Bread Show Good Results

RESULTS obtained in a comparison of shelf lives of freshly baked and frozen-and-thawed loaves of bread have been reported by James W. Pence and N. W. Standridge, Western Utilization Research Branch, Albany, Calif. They used two criteria (firmness and crumbliness, measured by mechanical procedures) in these comparisons.

Contrary to common opinion, they found that the keeping properties of the frozen and thawed loaves are slightly better than those of the freshly baked. Certainly, it is true, as evidence in these tests, that commercial freezing of bread need carry no penalty in shelf life. When the two were first compared, the frozen-thawed was slightly firmed. At the end of the second day, the frozen-defrosted bread was still as fresh as the unfrozen bread at the end of the second day after baking. Thereafter, during the six days of testing, the frozen-defrosted remained slightly fresher than the unfrozen.

Previous Data on Freezing

In previous work at WRUB, this project has produced data on freezing rates under various conditions of packaging and position of loaves in the air stream which Dr. Pence reported before the American Society of Bakery Engineers in Chicago. These data are valuable because they show that unwrapped bread with loaves placed crosswise to the air stream will really freeze very quickly and it may be possible to realize these advantages in practice. This work indicates that 10 F is satisfactory for storage lasting a few days, but for longer than a week, zero is recommended as a protection for flavor. Taste tests favored bread that had been frozen the fastest.—TRRF Information Bulletin.

NOTE: Question 1057 in the Question Box, regarding the process of bread freezing, including method used, temperature and time taken, and whether any special product formula is required, was answered in the June INDUSTRIAL REFRIGERATION.

Added Information

Elaboration of the above brief abstract the following additional information is offered:

Firming in bread crumb, measured as force per fixed deformation on whole slices, became progressively more rapid at storage temperatures of 86, 74, 54, and 46 F. At temperatures of 34 and 20 F, however, firming was only slightly more rapid than at 46 F. Comparisons of firming rates at the lower temperatures were difficult after the first day or two because, after appreciable firmness had developed, differences between loaves on the same day were often as large or larger than those between loaves on successive days.

At 86 and 74 F firmness increased almost linearly with time, but at the lower temperatures the relationship was definitely curvilinear. At the four lower temperatures used, approximately half of the total increase in firmness up to the sixth day after baking had occurred within the first 24 hours.

Firming in bread that was frozen and thawed before storage was slower than in other loaves of the same lot of bread stored without preliminary freezing; firming in the defrosted bread was compared to that in unfrozen bread starting at the same level of firmness. The freezing and thawing caused an amount of firming approximately equal to 24 hours of storage of unfrozen bread at 74 F or six hours of storage at 46 F.

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WRITE FOR BULLETIN TA249-F

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(Continued from Page 38)

panied by a number of the Chicago representatives of his firm. He makes his headquarters in Milwaukee.

The chapter meeting on May 24 was one of those rare field trips that turns out most every member and his uncles and cousins by the dozens, as the Atlas Brewing Company of Chicago was our host on that evening. A buffet supper was served to all members and guests in the Castle Room. Following a short business meeting, Atlas exhibited an educational film on the brewing industry, tracing the brewing process as followed by modern American breweries, and showing the huge quantities of agricultural product and utilities that go into the brewing of this beverage. The film was careful to point out the amount of revenue contributed to Uncle Sam's coffers each year as a result of taxation on every pint of beer produced.

During the business meeting the nominating committee came up with the names of respective officers and directors who will be voted on at the June business meeting. The committee also made some suggestions with regard to standing committee appointments and delegates to the National Convention. During this same business session, Honorary member and Past President, John W. Neff, was presented with his Golden Hour clock, suitably engraved, as a souvenir of the recent Midwest Conference which honored John, among four other 50-year men of the industry from this area.

A tour of the Atlas plant quickly indicated to the members just what can be accomplished by construction and engineering personnel of such an organization, in the way of modernization. The Atlas plant is an older establishment which has grown in "fits and starts" over the years. Its owners recently undertook a modernization program, features of which were discussed with the members and guests making the tour. Newest device was an automatic filter-press of stainless steel which utilizes a mechanically injected chemical on stainless screens, through which the beverage is forced under very high pressure. The rings are attached to a head or base. The cover of stainless steel jacket is movable over a horizontal track on the floor. The cover is removed for cleaning purposes after every so many gallons have passed through. Its operation for cleaning purposes is controlled electro-pneumatically.

Following the tour, members stood in rising vote of thanks to Harvey Brosseau, Superintendent Engineer for Drewry's, owners of the Atlas plant, and his senior engineers in the two Chicago plants.

Rio Grande Valley

ARMIN DONEIS

RIO GRANDE Valley Chapter held its annual party for installation of newly elected officers on May 10 in its LaFeria clubroom. Angus M. Casberg, past national president acted as master of ceremonies and introduced James Sweeney, district manager of South Texas Ice & Service, Inc. Mr. Sweeney praised the goals and efforts of NAPRE, and urged all members to avail themselves fully and constantly of the services and opportunities afforded them by their Valley Chapter. He acknowledged the fitness of each new officer for his particular duty and charged them all with the responsibilities of their respective offices as follows: Dan L. Chapman, president, Rube Keener, vice-president, Clyde Young, treasurer, Armin F. Doneis, secretary, Oscar Ransom, sgt.-at-arms and Angus M. Casberg, director.

Jim Sweeney, Armin Doneis, Oscar Ransom, Mrs. Dan Chapman, Clyde Young, Rube Keener, G. C. (Cliff) Musch, A. M. Casberg. Mrs. Chapman represented our new temporarily bedridden president.

After the installation of officers, R. A. O'Neill, national director and leading spirit of the Coastal Bend Chapter in Corpus Christi, spoke on NAPRE's important place in the refrigerating industry; as a means of training and developing much-needed engineers and operators to augment the diminishing supply. Mr. O'Neill expressed his surprise that not more managements encourage their men to participate in NAPRE's program here.

A. M. Casbert and Jim Sweeney, a couple of "King-makers" hatching a plot.

Richard D. Spaulding of Pharr moved the gathering to hearty laughter with his entertaining skits and impersonations, which were appreciated alike by members and guests. The NAPRE film about the recent national convention in New Orleans was shown by P. B. Myers of McAllen, thereby acquainting our members with their new national officers. Views of the west and of New Orleans were also enjoyed.

A. M. Casberg, master of ceremonies raps for order with his "gavel".

Mr. O'Neill reminded the members that all chapters have their ups-and-downs, and made several suggestions for improving attendance and growth. He proposed an attendance contest between members of the Upper Valley, and those from the lower portion of the Valley, with the winners eating a steak dinner furnished by the losers, while the losers ate beans and cornbread, and drank warm water. He also suggested that many of our Latin-American operators would be more interested and loyal to NAPRE if we could arrange for simple instruction sessions in Spanish, for those whose command of English doesn't suffice for technical discussions. He stressed the bilingual nature of our Rio Grande Valley, where Spanish speaking people predominate, and felt that such an arrangement might be advantageous to our Chapter.

Colton

HARRY BONTER

MEETING of May 11 was held at the Santa Fe Ice Plant lunchroom, San Bernardino, Calif. It was our pleasure to have George M. Baird, a former member of Michigan Chapter No. 1, who moved to Colton recently from Detroit, join Chapter No. 5 as a member. Mr. Baird gave a short talk on the past activities of the Michigan Chapter. He is at present operating a drive-in cafe business of his own in Colton.

E. H. Carlson, Mgr., Santa Fe Ice Plant, gave a talk on the construction and operation of an orange precooling plant just built in Redlands, Calif. They are precooling oranges packed in cartons before loading into refrigerator cars for shipment. The plant is fully automatic. In case of trouble, the plant will partly or wholly shut down as the case may require. The meeting closed with the usual lunch.

Modesto

HARRY DYER

CHAPTER members voted on May 17 to purchase a 16 mm sound projector for use in discussions and presentation of material used in our educational program. It is believed we can better our educational program, with film furnished by concerns dealing closely with products used in the refrigeration field. The matter of new members was brought out and since we have six new members in 1955, it was thought the possibility of increasing this to at least 12 by October would increase our active membership nearly 50 percent and put us back in the contest for the small chapter trophy.

Claude Kenworthy discussed compressor calculations from the King Course. A blackboard was used for diagrams and for explaining the refrigerant tables used. His method of discussion is such that everyone was able to follow the text to conclusion, with a good understanding of the tables.

(Continued on Page 42)

Pressures and Temperatures In Chemical Manufacture

PROCESSES that unlock chemicals from coal, air and water call for extreme pressures and temperatures. One phase of ammonia synthesis requires a pressure equal to that of a column of water 22 times as high as the Empire State Building. The picture on the cover of this issue shows ammonia compressor units in the background, and chilled water pumps forward which use a fourth of the plant's steam output. The turbo-pumps circulate water to a scrubber which removes CO_2 from process.

For most processes, whether the demand is for heat or cold, the primary mission is the production of steam that provides the energies required for manufacture of a number of chemical products. Some of the more important of these products include adipic acid, anhydrous ammonia, ammonium sulfate, catalysts, dimethyl sulphate, "Lorol" fatty alcohols, "Lucite" acrylic resin, methanol, sodium and calcium propionates, urea and proprietary antifreeze compounds. Ammonia alone is utilized in fertilizers, nylon intermediates, adhesives, detergents, finishes, foods (honest!) inks, pest control, plastics and in the manufacture of petroleum, paper, photographic equipment, and pharmaceutical intermediates.

Food applications for ammonia are: (1) a source of hydrogen for hydrogenated fats and oils, such as lard, margarine, etc., (2) used in water purification, (3) used as a yeast nutrient, (4) as ammonium bicarbonate is a substituent in the leavening of cracker dough, (5) as ammonium carbonate is a constituent of baking powder. Now, if anybody asks, "What do you mean—, they are using NH_3 in food?" you have your answer.

New Building For TRRF

AT a meeting of the Executive Committee of The Refrigeration Research Foundation in Chicago, April 12, plans were proposed and accepted for construction of a building in Colorado Springs to house the offices and records of the Foundation.

This building is made possible by a loan of $40,000 to the Foundation, without interest, by William J. Finnegan, a member of the Foundation's Scientific Advisory Council. Mr. Finnegan's home is Los Angeles, where he has worked over an extensive period as a consulting engineer and has developed equipment and principles that have contributed important advancements to commodity refrigeration and food freezing. The loan will be repaid as rent.

This is an important step in the progress of the Foundation since it will not only provide modern office space for the Director and the staff, but also will include a fireproof room for the valuable research records and publications.

Selling Packaged Ice Through Retail Stores

AT THE regional conference of the National Ice Association this year great interest is being shown in the sale of processed ice through retail stores. Many ice companies around the country are buying equipment of one kind or another to try out this market for ice. Some are experimenting on a conservative basis, with only one, two, or three stores. Others report that they have 10, 18 or 35 such outlets. One ice man at the Wichita conference said that his company had just purchased 50 cabinets for this purpose. There are differences of opinion on how to properly handle this type of service, but there is a lot of optimism about its future.

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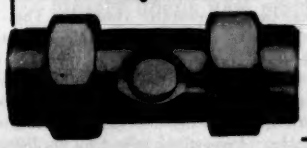

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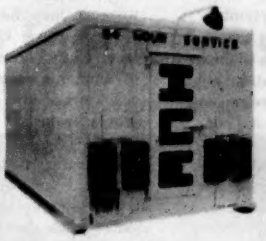

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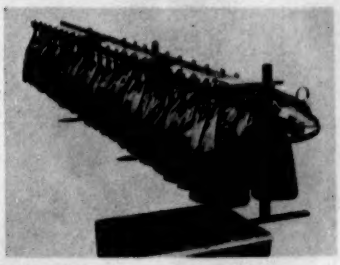

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(Continued from Page 40)

Memphis

CHAS. CONLEY

SIZING of circulating water pumps for condensers and cooling towers was the May 4 educational topic. H. L. Todd, the chapter's instructor was the speaker. He used the blackboard to show the group how to calculate the correct size of pump for the number of gallons of water to be pumped and the feet head against which the water has to be pumped. He explained the kind of pump that should be used. James W. Sarnes, Chief Engineer, University of Tennessee buildings at Memphis, was elected to membership.

On May 18, John Thrithart, field engineer, General Electric Company, showed a sound and color motion picture of the jet engine, its development, and as applied to the air plane. This picture showed the making of the Jet engine, how the planes were built and engines installed in them, the planes on test flights and planes in actual battle. Another picture was shown that depicted how gas filled automatic disconnect switch operated when opening. This was interesting to see how these switches function. The switches are used on high voltage power lines.

Yakima

ELMER TOOP

AUTOMATIC systems, which is the topic we are studying this season, was continued at our meeting in May. At the business meeting it was voted to send Elmer A. Toop as delegate to the National Convention in Los Angeles with Howard Eagles, alternate. It was voted to suspend meetings in July, August and September.

As a suggestion for study, the secretary was instructed to write to Guy R. King that we not only have refrigeration engineers, but steam and diesel men in our chapter so we would like a broader course of study. For example, we have five men working in hospitals, several in Welch's Grape Juice plant, quick freeze plants, etc. They have other things to take care of beside refrigeration.

Elmer Toop

Toop Takes New Position

Elmer Toop, Yakima's Secy-Treas., recently changed his place of employment. NAPRE offers congratulations, and a short background on this loyal member from official files. His first job was night fireman for Yakima's Central Heating Plant, 1926. Following, he was an ice delivery man and then pulled ice until 1930. In 1931 he went to Holtzinger Fruit Co., until 1940, when he became chief engineer for Stubbs Fruit Co., Yakima, about a 650 car storage. In 1945, he became chief engineer at Holtzinger Fruit Co., until offered the chief engineer's job at St. Elizabeth Hospital, May 1, 1955.

While at Holtzinger he rebuilt the entire coil system from dry system to wet header system. According to Elmer, the advantage of this system is lack of any need for an ammonia pump. Headers on each bank of coils act as an accumulator or liquid trap. Instead of liquid ammonia coming back to endanger compressors, it returns into the coil. Only the gas is drawn off and liquid made up in the usual manner of supply.

Seattle

JOHN GRAINGER

AT THE regular meeting April 21, the chapter instructor, Bob Harrison, covered Chapter 4 of the Guy King course on the subject of Expansion Valves. This proved a very interesting lecture, with most of the members present contributing their experiences as to the relative merits of the various types of expansion valves commonly used in industrial refrigeration. Carl L. Brown of the Bellingham Cold Storage was elected an active member.

Speaker for the evening was Larry Istas, a chemical engineer, Penn Salt Co., Tacoma, who talked on the manufacture of ammonia. He showed a chart (such as may be found in any text book) on the physical properties of Ammonia, and then gave a brief outline of the early methods of producing ammonia and of the various ways it may be done today. One of the early methods was from nitrates imported from Chile. Then there is the manufacture of ammonia from ammoniacal liquor from gas works, also the manufacture of ammonia from air, this latter method being the one employed in the works at Tacoma. In this process nitrogen is drawn from the air, and by means of catalysts liquid ammonia is obtained. The speaker stated that there is little impurity in the ammonia which is 99.98 percent pure; the impurities being nitrogen, hydrogen and water. It was pointed out to the members that ammonia will start to break down into its various components at 900 F.

Texas Coastal Bend

VERNON KUMMEL

AN attendance and membership contest for the chapter is now in progress. The chapter is divided into two teams and a point system, allowing ten points per member present, five points for a guest and twenty points for a new member, will determine the winning team. Our contest will end on August 19 which will give use seven meetings to rack up the points. The winning team will eat steaks, cold drinks and all the trimmings, while the losing team will eat cornbread, beans and drink warm water. Our present standings are Team No. 1, captained by Ed. Campbell is ahead with 110 points; Team No. 2, led by Frank Burton is trailing with a total of 70 points.

Our meeting of May 20 was very interesting as our guest speaker, introduced by Vic Skarke of United Supply, was Frank Kennedy of Kramer-Trenton Co., who showed slides and gave us a world of information on air-cooled condensers. The brief historical outline of air-cooled condensers showed the limiting factors as they used to be: (1) size limited due to size of chassis; (2) not enough air; (3) power loss — fan and compressor; (4) noise level due to fan; (5) dirt clogging condenser; (6) high head pressure; (7) poor location of unit.

The new types are remotely located, and under 20 ton capacity the cost of air-cooled vs water-cooled are much in line, while above 20 tons the air-cooled condenser would be about 10 percent higher in initial cost. Maintenance costs for the air-cooled condensers are much lower than for water cooled condensers. The hp requirements of the air-cooled condenser is lower than pump hp for water cooled, all according to the speaker. It was explained that many new installations have as many as eight compressors operating on only two air-cooled condensers. Winter controls were explained also. March 1955 INDUSTRIAL REFRIGERATION, Page 15, covered much the same topic under the title "Air Condensers For Large Tonnages".

St. Louis

BILL ALLEN

CHAPTER annual meeting and dinner party was held Friday evening, May 13, at Town Hall, Clayton. Cocktails preceded dinner, then came installation of officers, membership contest awards, and special surprise prizes. There was music, dancing and fun all evening.

St. Louis men attended the Regional Conference in Chicago. Frank Vitt, Swift & Co., Engineer at the National Stockyards plant, represented St. Louis on the program with a paper on "Electrical Wiring and Maintenance Problems." Others attending from St. Louis were Stan Tatalovich, Al Loeffel, and Ken Holaday.

Our April meeting featured Everett Carlson on temperature controls. The way Everett explained the principles and method of operation of various types of temperature controls, the whole thing seemed very simple. He illustrated his discussion with specimen instruments, and clarified a number of questions raised by his listeners. Four take-home April prizes of six-can packages of Falstaff, Griesedieck and Budweiser went to Palmer, Hughes and Tatalovich, and a lapel emblem went to Ollie Dahl.

New Officers Take Over

Officers elected at the April meeting to carry on the chapter program for 1955-56 are: President, Ed Lottie, Griesedieck Bros. Brewery; vice-president, Gene Kessler, Falstaff Brewery; Secretary, Ed Hughes, Milstadt (Ill.) Dairy; Treasurer, Charles Good, National Refrigeration Co.; Sgt.-at-Arms, Stewart Koenemann, U.S. Defense Corps.; Directors, Ray Cambron and Stan Tatalovich, Swift & Co. These men, with holdover Director John Dabbs, York, Corp., and Committee Chairmen to be appointed, will form the cabinet responsible for chapter activities during the coming season.

Transfer of liquid refrigerant was a well discussed question box topic. Whether to replace an old liquid transfer pump with a new one, or to install a Watkins recirculator, or a Phillips return system was a question submitted to Al Loeffel as our "Answer Man". Al outlined the principles and advantages of each method, and discussed also a new system offered by Vilter.

Lapel emblem membership awards went to Gene Kessler and Stewart Koenemann in April. New members signed up were Fred Batch, Falstaff Brewing Corporation, and Harry Palmer of F. W. Clemens Company. Kessler's Black Team won high points for the month. Total points to date are: Blue Team, Capt. Dabbs, 1665; Black Team, Capt. Kessler 1545; Red Team, Capt. Uplinger 1395.

Members-At-Large

BERT C. MCKENNA

THIS column has missed a few issues in order to make room for the reports on the Midwest Regional Conference. Now that that affair is over, we'll get back to our regular reports of members activities. Among the most pleasant duties since becoming a national director has been this opportunity as vice-president, to correspond with so many members-at-large. It has not only been interesting, but rather fascinating to contact engineers all over the globe, and in so many different types of refrigeration applications.

Correspondence from members-at-large in recent months has been predominated by our Canadian friends. Up in Nova Scotia we have heard from George Cook and in the neighboring province of New Brunswick, we are pleased to have heard from John J. Dolan and F. P. Driscoll. Gerard Bourret, Refrigeration Engineer for the Canadian Department of Fisheries contributed a question recently to our Question Box. Our educational chairman is always obliging and we encourage our members outside the United States to make use of his services. On the Westward side of Canada we have seen correspondence from R. S. Pearce of Winnipeg, Manitoba, J. J. Guise, Prince Albert, Sask., and John Gomany of Lethbridge, Alberta. John is another contributor to the Question Box.

Convention Reminder

This should be an opportune time to begin reminding our out of states members and foreign brothers that the National Convention will be held in Los Angeles in November. Each year now we have been gratified and happy to have members-at-large from abroad in attendance. We certainly hope that we shall be as fortunate again in 1955. We have recently had correspondence from Virgil Breshears at Anchorage and Wm. P. Sterling at Spenard, Alaska, and Walter E. Wilkinson of Honolulu. With the Convention in Los Angeles this would be a good year to attend fellows.

Two of our Mexican neighbors have corresponded recently, Francisco Requena Mas of Mexico City and Francisco G. Westendarp of Sullivan. Down in Panama we have heard from William Baker, chief of the El Panama, a Kirkeby hotel. Robert B. Brown remitted from Caracas, Venezuela and R. Redlich dropped us a line from Lima, Peru.

South Pacific Chapter

Wm. G. Syme, Auckland, New Zealand, attended our convention at Purdue in 1954. Bill wrote recently. Perhaps he could persuade member N. Goddard, Secretary of the New Zealand Institute of Refrigeration Engineers, to attend our California convention this year. Goddard also corresponded recently.

Members "down-under" recently heard from are David Trails, Jr., Brisbane, Joe Budge, who visited us last year; Will G. Cropper of Cropper Andrew Pty. Ltd., who sent us a new member from his own staff, James Kenny, and R. J. Slessar of Kew. In addition to Cropper and Kenny, other members of the firm have recently inquired with regard to starting an Australian chapter. They have been supplied full particulars and we would certainly like to see the Aussie equivalent of NAPRE established in their very fine country.

Continuing this informal trip around the globe, it should be mentioned that we have heard from P. K. Sarkar of the Calico Mills in Singapore, Malaya. A doctor friend of his with the City of

(Continued on page 61)

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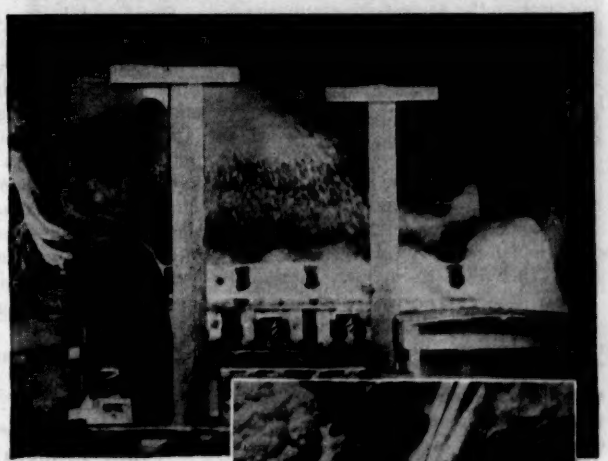

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From the President's Desk

Regis Gubser

CONSERVATION of our membership is the word for this month, July. All Chapters are urged to keep their Conservation Committee activated all during the summer months. This type of work is one in which our Associate members can be of great assistance.

However, July is also the month when most Chapters shut down for the summer. This is the time when the greatest effort is needed to get those delinquents in, and it is also the time when most members are running into their most difficult problems — during the heavy refrigeration load of the summer heat.

One good way to bridge the gap of our summer recess is to schedule a social event, as a pot luck dinner, ice cream social, swimming party, or a picnic. Any of these events not only makes it possible for the engineer to get some advice from a friend, but gives an opportunity to point out the advantages of membership to the prospect and to pick up back dues from the member in arrears.

Where social events are not feasible, the Associate member in his travels and contacts with members or non-members in the trade can, by sharp observation and discreet comments on the observation he makes, keep the Chairman of the Conservation or Membership committee, as the case may be, advised of the need of assistance by the delinquent or the prospective member.

Then, quite by accident, some other Active member could drop around or call to help the brother out and at the same time emphasize the value of the Association, and pick up the past dues or leave an application, as may be appropriate.

Cites Subject Discussions Other Than Refrigeration

It has come to my attention that some of our members, particularly in the smaller Chapters, are desirous of broadening their knowledge in fields other than strictly refrigeration. *This desire is commendable.*

Robert Uldegraff, a famous business counselor, in his fine book "Yours to Venture", makes some observations which point up the desirability of broadening your knowledge. He says every job has three dimensions — *depth, breadth, height.*

Depth is the ability of getting to the bottom of the job and working up. It means building a foundation of information about a job.

Breadth is the area of a job, the size of it, or how big can a man make it by imagination and initiative? The things a man does over and above what is required, is such an example.

Height is the ceiling or roof, and in most jobs this has not been reached. The best way to bump the ceiling is to get excited over one job and thereby be drafted for a bigger job.

The feasibility and practical value of studying or discussing subjects such as boiler operation, water treatment, steam engines, electric motors and generators, in addition to refrigeration theory and problems is entirely compatable. The same basic underlying principles of thermodynamics, chemistry and physics are involved in all these operations.

Now how can these objectives best be accomplished? In the larger cities and Chapters there are most likely Associations similar to ours that are devoted to steam plant operation. This would make it possible for a man to associate with such a group in addition to ours, and thereby receive his additional information.

Suggests Book Reviews By Chapter Individuals

In areas where above conditions do not exist, our Chapters can help themselves in several ways. I will suggest a few:

First, and by no means the least, ask questions of the "Question Box."

Second, invite speakers, or obtain films on desired subjects every second or third meeting.

Third, obtain a book from the public library or from a book store, and have a class instructor on the desired subject, hold a regular preliminary class at alternate meetings, or every third or fourth meeting as desired.

The fourth and very excellent method, is to find someone who subscribes to one of the power engineering monthlies, such as "Industry and Power", "Power Engineering", "Plant Engineering". If you do not have a member who subscribes, you may be able to get a copy from the public library, or have the Chapter subscribe through the National Office.

When you find an article in one of these which you believe is of general interest, assign one member to read the article and give a summary and discussion of it at the next meeting just before the regular speaker or after the class session. I assure you, you will be surprised at how much ground you will cover, and how much good discussion you can provoke with such a procedure. In such discussions of written articles, you are often amazed at the local talent and knowledge that is uncovered.

Plugs Convention-Vacation

Now that vacation time is upon us I just want to remind you not to spend all of your vacation budget right now. Save enough so that you and your wife will be able to attend the 1955 Convention here in Los Angeles. Our local committees are planning many wonderful events for your education and enjoyment.

The ladies will be well entertained as they have always been in the past. The men will hear some worthwhile educational sessions, be invited to a choice of several field trips, to say nothing of a golf match and fabulous night club dinner parties.

I urge you to start talking up this trip not only at home, but at your place of employment as well, so that nothing will interfere with your plans.

June brought us the 15th issue of our annual Operating Data Book. If you haven't received your copy, contact your Sergeant-at-arms. He is the responsible officer for their delivery; but, if you happen to be in arrears with your dues, your name won't be on his list. Don't miss the half-dozen added features of the new edition.

Regis Gubser

Convention-Time Is Vacation-Time

LAWRENCE H. BENEDICT
National Publicity Committeeman

California No. 2 Chapter Sets Theme For NAPRE 46th Meeting; Join Public Relations Staff, Los Angeles Chamber of Commerce.

VACATION-TIME is with us again, and with it arises the question: "to go or not to go" to the NAPRE Annual Convention in Los Angeles in November. National and local committees have been busy for six months on arrangements. As always, emphasis has been on educational features, but the "after-working-hours" attractions, and the ladies' programs especially, have received a great deal of attention.

Convention entertainment chairman, Ed. L. Nelson, a typical Chamber of Commerce devotee ('bless him), says "Visitors to this wonderful metropolis are never at a loss for something to do or some place to go for amusement, enlightenment, or just plain sightseeing.

"Glamorous Hollywood, that indefinable area which has an outward appearance much the same as any other part of Los Angeles, is a tourist 'must'. Movie studios are scattered from Culver City through Hollywood proper to the San Fernando Valley, but the glitter and 'make believe' of the movie-making world permeate the film capital stores, restaurants, theatres and even the appearances of the inhabitants."

The Golf match is shaping up very nicely, according to V. A. Stubblefield, chairman. There will be prizes given in the form of golf balls and other golfing accessories. "Convention-Match" will be set up on a handi-cap basis, so those wishing to enter should bring along their indicated handi-cap whereby we may rate them properly in the tournament play. The Montebello Golf course has its hazards equally divided, with lush greens and rolling fairways. The course par is 72, but if a member can come in with an 80 to 82, he will have a fair chance of winning something. The Clubhouse has a snack bar and a 19th-hole watering trough for those who become parched after playing 18 holes of golf. We figure that that is a golfer's disease and are prepared to offer dosage to alleviate the sufferer, even on the fairway.

Offers Accommodation Variety

One of the big factors to consider in determining your budget, is the accommodations while on the West Coast. The Convention Headquarters will be the Ambassador Hotel, with its tropical atmosphere, swimming pool, and world-famous Cocoanut Grove, where a number of recently-decorated, television equipped rooms have been set aside for our meeting The committee is also making arrangements with some nearby hotels to accommodate anyone desiring to stay at other than the Convention hotel.

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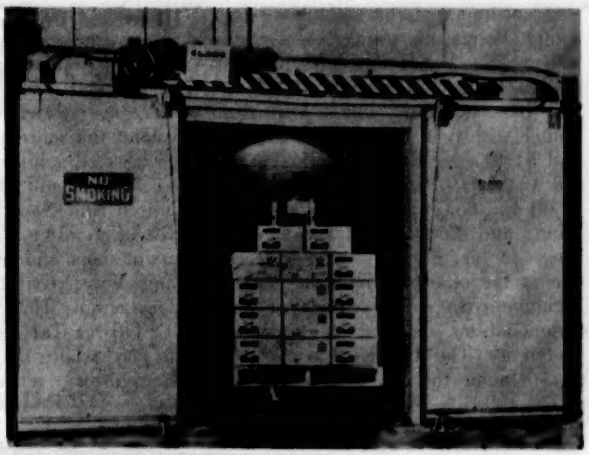

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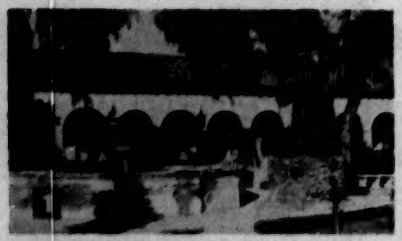

Fig. 1—San Fernando Mission, founded 1797, along El Camino Real, the King's Highway. Monument is Fra Junipero Serra and Indian Youth, representative of this Missionary's work. Fig. 2—Easter Services at Hollywood Bowl, an annual religious spectacular. Fig. 3—Hollywood Freeway, a modern main arterial; view is East toward Los Angeles City Hall Tower. Fig. 4—Mt. Baldy and Orange Groves as near as 40 miles from downtown Los Angeles. Fig. 5—Wilshire Blvd. divides MacArthur Lake — as seen from the Elks Club Hotel.

We hope that each individual member will arrange to make "Convention-Time Vacation-Time". See you in L.A.!

According to George Paulick, Accommodations Chairman, room costs also will be very flexible. At the Ambassador, a single room with bath will be $9.00 and $11.00; and a double with twin beds will be $12.00 and $14.00 per day. Other hotels in the vicinity start as low as $4.00, $7.00 and $8.00 per day for a single room; and $5.00, $9.50 and $11.00 for a double. Fig. 5 is a view from one of the other Club hotels.

Summarizing: The choice of accommodations become a personal preference. The difference in over-all costs among the hotels is nominal.

Historical Points

There are many points of historical interest and scenic beauty which enhance the attractiveness of the area. Among the more prominent are Olvera Street, a bit of old Mexico with curio shops and cafes; Old Mission Church and San Fernando Mission (see Fig. 1); Chinatown, where quaint shops and restaurants line Gin Ling Way; Griffith Park and the planetarium; Hollywood Bowl (Fig. 2); LaBrea Tar Pits in the heart of the city, where the richest collection of prehistoric remains in the world were found; San Fernando Valley with its "outdoor life" homes and suburban farms; Santa Catalina Island with flying fish and submarine gardens; the world-famous Los Angeles-Long Beach Harbors; and the impressive Palisades overlooking the beach at Santa Monica.

Food Products-Refrigeration California Industry Leaders

In addition to its high vacationland potential, the Los Angeles County area has grown industrially, keeping pace with the phenomenal population growth. Shattering, in the past few years, all previous records for capital investments in new and expanded manufacturing plants, Los Angeles has averaged 75 new plants and in-

(Continued on Page 60)

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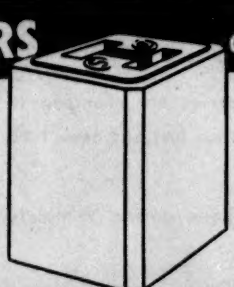

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Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

Pipe Identification Colors

QUESTION NO. 1059: What is the generally accepted color code for painting pipe lines in the engine room? We would like to paint the following: water, liquid ammonia, ammonia suction, ammonia discharge, ammonia Valves, and ammonia pump-out lines. If there is any particular code that is applicable, we would appreciate your listing of these colors.—J.B.E., Denver.

ANSWER: A plan for the identification of piping systems has been published by ASRE under the partial sponsorship of the National Safety Council. The scheme developed does not really cover the details of refrigeration lines as thoroughly as you would want to in your own engine room. As you will see from the table, most of the selection of colors would be up to you, provided you stayed within certain general color specifications. Each piping system is classified, by the nature of its contents, into certain classifications.

It is possible that as a result of the question appearing in this column we may receive some additional correspondence which might be of particular use to you. One other item of importance, in connection with this color scheme is that fresh water lines are classified as safe material and are painted green, while fire protection lines are always printed red because of the importance of the lines. Refrigerant lines are all considered dangerous materials.

Detailed Information For An Identification Scheme

List all materials carried in the pipes of the system, or systems.

Assign each of these materials to one of the five main classes.

Group the materials assigned to each class for the purpose of facilitating the selection of sub-class markings.

Choose between the alternative methods of: (a) color bands; or, (b) complete color painting.

Assign a legend or color stripe to each material listed under each main classification.

Select the five color paints which will identify the main classes and the paints to be used for the stripes, if the use of stripes has been decided upon in place of legends.

No type of paint or other suitably colored coating is excluded. The selection of coatings comes under the jurisdiction of the supervising engineer or person in authority, and may be made to meet the diverse requirements of each case. All that the scheme requires is that the dominant hue of the band shall fall unmistakably within one or the other of the five spectral regions.

Colors which have a total reflective value too low to permit ready differentiation at minimum illumination are excluded. Median gray, which from the physiological or visual standpoint is situated about half-

(Continued on Page 50)

GENERAL COLOR SPECIFICATIONS FOR PIPING SYSTEM IDENTIFICATION

Symbol	Class	Color
F	Fire Protection	Red
D	Dangerous Materials	Yellow (or Orange)
S	Safe Materials	Green (or the achromatic colors; white, black, gray aluminum)
P	Protective Materials	Bright Blue
V	Extra Valuable Materials	Deep Purple

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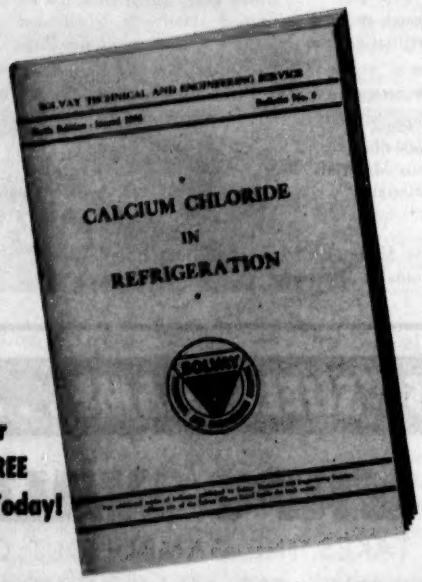

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56-7

Frozen Food Pack For 1954 Shows Small Decrease For Fruits and Vegetables

STATISTICS on the frozen food pack for 1954 have been compiled and issued by the National Association of Frozen Food Packers from reports received from individual packers. The packs for which data are given represent the commercial pack and do not include quantities frozen by industrial users or other types of processers including frozen food locker plants.

FROZEN FRUIT AND BERRY PACK FOR 1954

Product	1953 Pounds	1954 Pounds
Fruits:		
Apples & Applesauce	42,355,751	60,094,113
Apricots	3,962,453	5,404,177
Cherries, Red Tart	115,241,575	86,695,315
Cherries, Sweet	1,739,055	3,639,243
Grapes & Pulp	10,109,933	9,411,389
Peaches	32,170,960	36,379,902
Prunes	8,356,212	4,497,957
Berries:		
Blackberries	17,965,976	14,155,967
Blueberries	13,987,828	20,971,086
Boysenberries	9,705,717	12,741,479
Currants	3,794,161	2,284,696
Gooseberries	131,882	203,608
Loganberries	2,303,115	2,591,766
Raspberries, Black	8,974,588	8,297,540
Raspberries, Red	24,895,385	23,502,363
Strawberries	225,962,537	221,445,704
Miscellaneous Fruits & Berries	20,303,513	10,674,100
Total	541,960,641	522,990,405

FROZEN VEGETABLE PACK FOR 1954

Product	1953 Pounds	1954 Pounds
Asparagus	32,945,017	25,779,827
Beans, Green and Wax	114,780,576	123,252,876
Beans, Lima	138,594,897	129,674,479
Broccoli	89,042,671	62,003,684
Brussels Sprouts	40,801,491	33,418,003
Carrots	29,331,684	27,493,754
Cauliflower	35,709,895	17,087,730
Corn, Cut	104,809,364	72,211,581
Corn-on-Cob	17,217,147	16,787,989
Kale	4,071,543	4,251,320
Mixed Vegetables	30,910,006	23,805,365
Okra	12,284,624	7,756,028
Peas, Blackeye	6,431,265	5,697,488
Peas, Green	226,664,161	206,854,061
Peas and Carrots	19,550,674	14,551,261
Potato Products	70,691,174	85,255,506
Pumpkin and Squash	9,472,482	13,035,691
Rhubarb	8,348,507	6,751,009
Spinach	87,927,229	66,900,516
Succotash	14,189,791	9,364,191
Turnip Greens	5,271,810	7,496,739
Miscellaneous Vegetables	4,223,885	9,199,095
Total	1,103,269,893	974,628,193

Louisiana Ice Plant Offered For Sale

THE ICE plant and utilities office building of Central Louisiana Electric Co. at Alexandria, La., has been offered for sale. F. Hugh Coughlin, president of CLECO, said the ice plant offer is in line with the company policy of eliminating all nonutility properties. The company has sold all of the plants it formerly owned except the one in Alexandria and five or six others which, he said, are closely integrated with specific utility operations.

Poultry Products Packaging Clinic

A SERIES of eight presentations on packaging problems will headline the Institute of American Poultry Industries' first Poultry Products Packaging Clinic to be held June 6 at La Salle Hotel in Chicago. The one-day clinic is designed to assemble the packaging problems in the processing and marketing of poultry and eggs, offer current solutions and propose needed developments.

Beginning at 9:30 Monday morning with Robert D. Lowry, Dewey & Almy Chemical Company as chairman, speakers representing various phases of the route poultry and eggs take from processor to consumer, will outline problems in package design, materials and equipment. Mike Khoury, Armour & Co., Carl Piowaty, Emulsol Egg Products Co., and Paul Cremeens, Edson, Pratt and Riley, Inc., will lead off, representing shell egg processors, egg products processors and poultry meats processors, respectively. William J. Hoover, Refrigeration Research Foundation, will represent the warehousemen, Eugene Brown, Producers Distributing Agency, the distributors and Cliff Bowes, National Association of Retail Grocers, the retailers, and the transporters of eggs and poultry will be represented by a speaker to be announced.

After luncheon, the clinic will resume with a talk by Dr. George F. Stewart, University of California, on the technical requirements of packaging.

Questions and Answers

From 2:30 p.m. to 4:00 p.m. the meeting will be devoted to a question and answer session. Panel members will include the speakers at the clinic and M I. Darrow, Swift and Company, Frank Rubinate, Food and Container Institute, Joseph Mueller, National Tea Co., and Harold Williams, Fox DeLuxe Foods.

An examination of special displays will follow the question period until 5:00 p.m.

Attendance at the clinic planned for poultry and egg processors, distributors, transporters, refrigerated warehousemen, retailers and package material and equipment suppliers, is limited to 250, according to Dr. Cliff D. Carpenter, president of the Institute.

Materials Handling Exposition

THE National Materials Exposition, with a three-day session of the American Materials Handling Society, was held at the International Ampitheatre, Chicago, May 16 — 20. The show, one of the largest in the country, displayed $10,000,000 in equipment and attracted some 30,000 executives and engineers.

Materials handling, first introduced as a major industrial development after World War II, started by providing machines for carrying relatively small loads. Newer developments, however made it possible for a single operator to move huge burdens and a number of lift trucks, trailers and conveyors have greatly reduced the time formerly required, with a consequent saving in labor costs. Since much of materials handling concerns itself with either avoiding the necessity of handling, or if it is unavoidable, moving the materials by automatic processes, the science is commonly regarded as being the heart of automation, or push-button factory production.

The American Materials Handling Society staged a three-day conference at the Ampitheatre May 16 — 18. An interesting part of its emphasis was on the development of good materials handling systems for old, multistory plants.

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(Continued from Page 47)

way between white and black, reflects approximately 25 percent of the incident standard white light and is near the permissible limit of reflective value for poor illumination. The permissible limit of reflective value is provisionally established at 19 percent.

An ordinary hand flash lamp when held by an operator at the reading distance may be used as the arbitrary measure of minimum illumination.

Clear Ice From Well Water Without Distilling Costs

QUESTION NO. 1060. We are running an ice factory with a steam plant. We recently had an analysis made of our well water and received the following results:

Total Solids — 625 ppm
Acid Radicals:
Bicarbonate — 280 ppm
Carbonate — 90 ppm
Chlorides — 93 ppm
Sulphates — 95 ppm

The ice manufactured from this well water is opaque and does not sell well in the market. Hence we manufacture ice after distillation of water. This is costly and does not stand market competition.

Will you advise how we can manufacture transparent ice from this well water without resorting to distillation? —T. S. Punjab, India

ANSWER No. 1: The analysis presented of the water supply does not include a determination of the cations. This water could probably be lime treated, settled and filtered and produce a satisfactory quality for ice-making. However, in the manufacture of ice it would probably be necessary to air-agitate and core the blocks during freezing. The bicarbonate would be eliminated by lime treatment and at the same time there would be a probable reduction in hardness, although the hardness concentration is not given in the analysis.

The detailed procedure for this treatment can be found in a number of textbooks, such as, *Water Supply and Treatment*, National Lime Association, Washington, D.C., *Water for Ice Making & Refrigeration*, Ehrenfeld & Gibbs, *Boiler Feed & Boiler Water Softening*, Blanning & Rich, and *Practical Ice Making*, Authenrieth & Brandt, all Nickerson & Collins Co. publications.—R.M.W., Los Angeles, Calif.

ANSWER No. 2: A review of the "Water Treatment" article in the 1954 NAPRE *Operating Data Book* indicates some useful information for analyzing this problem.

The results to be expected from treatment of the water depend to a considerable extent on the basic radicals of the dissolved minerals. Since these radicals are not reported in the certificate of analysis submitted with the question, we will make the following reasonable assumptions: (a) that sodium is present in an amount equivalent to the chlorides, sulfates, and half of the carbonates, (b) that magnesium is equivalent to the remainder of the carbonates, and (c) that calcium is equivalent to the bicarbonates.

These combinations would give a total solids content over 800 ppm. Since this is not inconsistent with the reported value of 625 ppm we may make another assumption that the total solids determination was made by the conventional procedure of evaporating a measured amount of water and weighing the dry residue. By this method, half of the bicarbonates would be lost during evaporation, and would thereby escape the weighing.

It does not make very much difference whether these assumptions are correct. Any possible combination of the constituents indicated will give a difficult water to use for ice manufacturing.

If other ice companies in the area are lucky enough to have good water, then this plant cannot compete. However, if the analysis is typical of the entire region, there are some things that the engineer can do to make a fairly good product which will be acceptable in a market where competitors may also have trouble in maintaining good quality.

Aeration may dissipate a large part of the bicarbonates, and most of the remainder may be precipitated together with the carbonates by means of lime treatment followed by sedimentation and filtration. This should reduce the total solids to less than 400 ppm. The water would then be within a range where extra initial agitation, or double coring, or perhaps a combination of both, will produce a fairly clear block of ice.

Unfavorable factors in the treated water will be the high pH value resulting from lime treatment, and the relatively high chloride and sulfate contents. These may give some cracking troubles, and they can be reduced only by distillation or by ion exchange demineralization. Demineralization is expensive, but generally much less costly than distillation.

The question does not state the brine temperature at which the plant operates. This is another important factor, because all of the problems of ice quality are affected by the freezing temperature. If the plant has some reserve capacity, quality can be improved by operating at a higher brine temperature and freezing more slowly.—K.M.H., St. Louis, Mo.

Seeks Mobile Defrost System

QUESTION NO. 1061. I manage a cold storage plant with Calcium Chloride Brine System refrigerated by two ammonia compressors 7½ in x 7½ in and 5½ in x 5½ in. I want to find the best method for defrosting the coils in the room.

In Calcium Chloride in Refrigeration," by Solvay Technical and Engineering Service, Bulletin No. 4, Sixtieth Edition, Issued 1953, page 33, I see in paragraph 3 a periodic defrosting by a portable tank unit complete with electric heater. That system would be convenient for my purposes. Have you any information on the subject? Are those portable tanks manufactured? Any plant you know equipped with a portable tank?—G. B. Rimouski, P. Q.

ANSWER: I have made several inquiries but I have been unable to find any firm which manufactures and sells such units. However, I understand that the Quaker City Cold Storage and Warehouse in Philadelphia, Pennsylvania, is currently using units of their own design. They are reported to be very satisfactory.—H. P. Hayes.

Queries Detrimental Effect Commercial NH_3 Impurities

QUESTION NO. 1062: Concerning R.T.'s answer to (Question No. 1047) in the April issue "Industrial Refrigeration", R.E. explains that commercial grade liquid ammonia is 99.50 percent pure while refrigeration grade lacks .002 percent of being pure. I am wondering just what these impurities in the commercial grade would consist of. Would they be of an explosive or perhaps corrosive nature, or would it be in the form of moisture?

We are of the opinion that such a small amount of impurities would be of no consequence at all especially where close attention is given to purging.

It so happens that we have almost an endless supply of the commercial grade of ammonia at our back door, and at a price of less than half what we are paying for the refrigeration grade. We are quite anxious to take advantage of this cost situation, as well as the convenience of delivery if such a thing is possible. I shall greatly appreciate any information that it is possible to get concerning the above.—B. E. S., Fairmont, Minn.

ANSWER: Upon receipt of your question, I directed letters to two well-known suppliers of refrigeration grade ammonia. In my letters, I pointed out that in tank car quantities the price of commercial grade ammonia is approximately $85.00 per ton and that of refrigeration grade ammonia is about $87.50 per ton. The question to be asked is if the difference between commercial grade and refrigeration grade is only $2.50 per ton in tank car quantities, why is there such a large price difference at the final retail outlets?

To date, I have received a reply from one of the suppliers. This supplier indicates that the difference is due largely to the cost of owning, servicing, maintaining, and distributing the refrigeration ammonia in individual high pressure cylinders. He also indicates that the principal impurities in commercial grade ammonia are very small amounts of noncondensable gases, water, and a trace of oil. The commercial grade ammonia might contain 20 or 30 times as much noncondensable gas as does the refrigeration grade product. This would be separated in a refrigeration system and would have to be removed by venting or purging the system.

Your point that commercial grade ammonia could be used in a well-maintained system appears to me to be one which is well taken. However, any such action on your part will be a big step and I doubt that any supplier, or engineer for that matter, would want to take the responsibility for making such a recommendation.

I am suggesting to the officers of the NAPRE that a committee be appointed

to deal directly with the suppliers of refrigeration ammonia in an attempt to resolve this question. As I receive further information on my own studies, I will make certain that it is called to the attention of the membership.—Harold P. Hayes.

Editor's Note: Right at press time, another answer to this perplexing question is received from an NH_3 distributor in the Southwest. His remarks contain additional information and advice. Watch for his reply next month.

Does Energy of Compression Dissipate in Cooling Water

QUESTION NO. 1063. If you had a water cooled air compressor which was operated slowly enough to compress the air without raising its temperature, where would all the energy of compression go? If I understand the fundamentals correctly, the energy content of air doesn't change unless the temperature changes. As I see it, you haven't added any energy to the air so all the horsepower input just heats up the cooling water. So if you end up with 100 psi compressed air that doesn't have any more energy than when you started, what have you accomplished?—J. H., Santa Clara, Cal.

ANSWER: It is true that for practical purposes the heat content of air depends only on the temperature of the air. Consequently, in a constant temperature (isothermal) compression, the heat content of air would not be changed and to all appearances all of the energy input by the driving motor would appear as heat in cooling water of the compressor. This is where the idea of entropy enters the picture. The entropy of air is a measure of the availability of the energy in the air. High entropy means that most of the energy is unavailable while low entropy means that most of the energy in the air can be easily utilized. What happens in the constant temperature compression of air is that the entropy of the air is decreased. In other words, although the energy input from the motor does not increase the heat content of the air, it does make the heat content present easier to utilize. We know this to be the case, of course, because high pressure air can be more readily utilized than low pressure air of the same temperature. —Harold P. Hayes.

New Questions

Asks Inhibitor Suggestions

QUESTION NO. 1064: In January '55, page 41, Question #1032, in the final paragraph of an answer on "Bulging Ice Cans" you will see the reference "use an inhibitor to prevent corrosion." We in Australia have tackled this problem of corrosion from many directions, starting with pH control and the employment of various subsequent treatments. But have you a firm recommendation as to the best inhibitor which can be used?—N. K. General Secretary, Ice Manufacturers' Assn., New South Wales.

Challenges Practical Use Of Artificial Head Pressures

QUESTION NO. 1065: On page 17, April '55, INDUSTRIAL REFRIGERATION, under "Operating Practice", there is a statement "During the winter, the head pressure is allowed to drop no lower than about 110 psig so that the evaporators—some of which are several hundred feet away from the compressor room—will be adequately fed with liquid". I know there is room for lots of improvement there.

There is one plant known to me in particular, where the farthest evaporator is more than 200 feet from receiver and condenser. Pressure in winter plenty of times is less than 75 psig, and this has been in operation since 1926. Sooner than carry high condenser pressure in winter, larger liquid lines for distant evaporators would be less expensive.—M.S.J., Baltimore, Md.

(Continued on Page 56)

HACCO #3 QUICKIES

FOR BETTER ICE

Pressed from non-toxic anti-crack compounds. 125 Quickies per pound. Dissolves in cold water in approximately 1/2 minute. Improves quality of ice–tempers–prevents checking and cracking.

DOSAGE: Add 1 or 2 Quickies to ice can before or while filling with water. By the time can is filled, Quickies are completely dissolved. If necessary, add 1 Quickie after sucking core then fill with water. This improves core and prevents further cracking.

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Order Barrett Brand Anhydrous Ammonia today, in 150-, 100- or 50-lb. cylinders. Your local dealer is the man to call too if you want larger quantities, such as tank cars or tank trucks. Call him today.

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Hoover Commission Reports on Warehousing

THE LONG awaited Hoover Commission Report on Depot Utilization (warehousing and storage) has been released. As reviewed by Quick Sheet issued by the National Association of Refrigerated Warehouses, it contains a number of new facts about government storage operations, reconfirms some previously well known facts and makes recommendations for the disposal of surplus government storage facilities and for more efficient storage operations. Highlights from the report include the following:

1 — The government operates a total of over 695 million square feet of storage space.

2 — The Defense Department operates 83 percent of all government owned covered storage space, a total of 579,049,000 square feet.

3 — The Military departments spend an estimated $2,900,000,000 a year on storage activities.

4 — "There is. . .great excess of storage space, duplication and consequent waste in the Department of Defense."

5 — Over 100,000,000 square feet of storage space operated by the Defense Department is not listed on its operating records.

6 — "There were numerous indications that operating costs were high by commercial standards. Cost is the acid test of efficiency in industry."

7 — There is about 172,000,000 square feet of storage space, all but 2,000,000 square feet of which is operated by the Department of Defense which could be eliminated at an annual savings of $282,000,000. Additional millions of dollars could be saved through greater use of commercial storage space.

Recommendations

The report recommendations include the following:

1 — Disposal of surplus storage space as follows: (a) Used, where practicable, for the storage of strategic stockpile materials. (b) That facilities retained for emergency purposes be placed in a "mothball" status. (c) Remaining facilities be disposed of in the best interests of the government.

2 — That the military service make greater use of commercial cold storage and merchandise warehouses.

3 — That a uniform system of accounting for storage operations be established for independent comparison of military storage costs with commercial storage costs.

Food Technologists Report on Research

A NUMBER of reports on progress in TRRF-aided Research were presented at the 15th annual meeting of the Institute of Food Technologists held at Ohio State University in Columbus, June 12-16.

J. G. Woodroof and E. K. Heaton of the Georgia Experimental Station reported on packaging to control moisture condensation. The Western Utilization Research Branch of USDA, Albany, Cal., presented three reports from the temperature-tolerance studies on frozen foods, and two on fruits. Another report from USDA was on studies on freezing and frozen storage of bread. A project in which TRRF has been interested was reported by the Eastern Utilization Research Branch of USDA. The report was concerned with effects of prefreezing delay on the drained weights of frozen RSP cherries.

Northwest Ice Association Annual Convention

THE ANNUAL Convention of the Northwest Association of Ice Industries was held at Portland, Ore., May 14 and 15, with a good attendance of members, including the presence of 100 percent of the Canadian members. The convention was opened Thursday morning, President Garvin presiding.

A talk on Safety was given by Capt. John Richardson of the Portland Police department. He suggested that the Police departments of various cities would cooperate in making tests of drivers as to their driving competence and whether they were likely to be involved in accidents.

Lyman Bunting, a pioneer ice man, and former president of the Association, told of some interesting happenings during the early days of the ice industry with more or less frequent price wars between competing ice companies. He also touched on modern ice merchandising such as selling sized ice in individual paper bags.

C. P. Austin from the National Ice Association gave a very interesting talk on the newer markets for ice. He was followed by Duane Dryden on the same subject.

Gilbert Harris spoke on the subject of Operating Efficiency in Ice Plants. Mr. Harris is well qualified to talk on this subject and he presented a number of valuable pointers.

Ken Davidson gave a humorous and interesting talk which included a lot of good sound information.

Thursday evening a special and unusual Chinese dinner was served.

Regional Conference

Friday morning a regional conference was held by the National Association of Ice Industries, conducted by C. P. Austin. Mr. Austin had prepared a list of merchandising subjects to be covered, all of which were listed on a blackboard. Slides were shown and brief discussion on each subject was presented by Mr. Austin and this was followed by general discussion. This was considered a very valuable part of the program and it was interesting to note that on two or three of the subjects different ways were offered, all accomplishing the same or similar results.

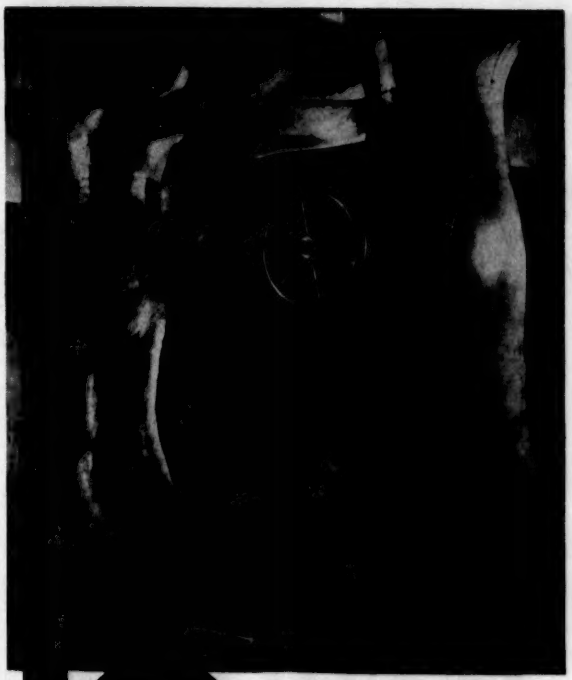
At the noon recess Friday, the new board of directors held a meeting and selected as officers for 1955, the following:

Officers

President, W. L. Baker, Seattle, Wash.
Vice-President, William Wilson, Victoria, B. C.
Secretary-Treasurer, W. F. McCracken, Anacortes, Wash.
Executive Secretary, L. F. Marsh, Portland, Ore.

It was decided that a 20 percent increase in the dues be made to enable enlargement of the contributions to the National Association and to provide more money for local use. The date for the annual conference was set for September 30, and the annual convention will be held at Seattle, Wash., date to be announced later.

The convention was wound up Friday evening with the usual banquet. The new officers for 1955 were announced and introduced. Following the custom originated last year the retiring president Sam Garvin was presented with a pair of silver ice tongs. Charles Holloway, Jr., was the speaker for the address of the evening. Mr. Holloway gave a very interesting talk mixing in a lot of serious ideas along with lighter stories.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Ozite is practically indestructible because it is made entirely of nature's most perfect insulant —hair. It applies easily and without waste . . . renders low conductivity for efficient heat barrier . . . allows close temperature control . . . cuts power consumption.
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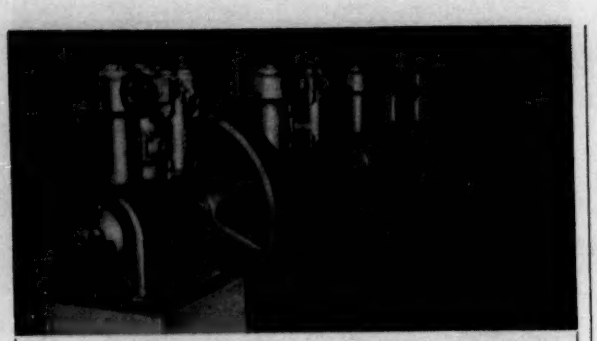

HOWE COMPRESSOR INSTALLATION showing 4 models G-20-6½", 2 models GB-20-6½" Boosters, and 1 model G-15-5½".

NEW 1955 IMPROVED

HOWE

REFRIGERATION

EQUIPMENT

WE ARE PROUD of the compressors we have built that you are now using. Untiring field research and diligent application of these findings have constantly improved HOWE equipment. Today's modern units are finer in construction, more efficient in operation, and provide the same trouble-free service that Howe machines have given for 43 years.

MODERN COOLING SURFACE UNITS include the Rapid Freeze Coolers for low temperature work, and the Polar Circle Coils for normal temperature coolers.

These give maximum results with minimum first cost and low maintenance costs.

Every Howe product is correctly engineered for its exact application. Please consult us on your refrigeration projects.

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SINCE 1912, manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment. Immediate delivery!

Radiation of Foods Not Around Corner

KIPLINGER'S Agricultural Letter for May 6, 1955 predicts with effervescent enthusiasm, that commercial availability of radiated foods is practically "just around the corner", making essentially obsolete (presumably soon) all refrigerated facilities in this country. Concerning this Ivory Tower thinking, the TRRF Information Bulletin has this comment:

"No evidence that the Foundation has had direct, in recent months, from researchers in this field at MIT, University of Michigan, American Meat Institute Foundation, GE at Milwaukee or other places, supports the broad inferences of the Kiplinger letter that commercial sterilization of foods generally by radiation is at hand soon, or even in the distant future. The Foundation and NARW are immediately taking up this matter with Kiplinger to get the facts into right focus. . .

"The Director wishes that responsible people in the United States who feel that they must refer to food radiation would let scientific research take its proper course in adequate time and wait for the facts. In the meantime, let us desist from extravagant predictions which only raise expectations in the public mind, which are not justified." (See article on this subject by Dr. Bernard E. Proctor in the July, 1954 INDUSTRIAL REFRIGERATION).

On this same subject, Dr. L. E. Clifcorn of Continental Can Co., in an article in Nucleonics, January, 1955, stated that thorough evaluation must be made of what foods are benefitted by this new process and whether these benefits are sufficient to carry higher capital investment, operating and consumer education costs, at least in the early stages. These evaluations must follow fundamental research to determine whether the necessary preservation objectives can be achieved by any means at any cost, through radiation sterilization. There is a general belief, according to Dr. Clifcorn, that there will be some application of ionizing radiations in the food industry within the next ten years.

New Freezing Plant For Strawberries

A NEW $100,000 freezing plant will be erected in Fallbrook, Calif., for Yasukochi, Huscher & Associates to process and freeze strawberries when fresh fruit prices decline. Nineteen strawberry growers of Vista, San Luis Rey, Escondido and Fallbrook have banded together in the enterprise and have formed a corporation, with Fred Yasukochi of San Luis Rey as president, and Carroll Huscher of Fallbrook as secretary.

The plant will have a capacity of 20 tons of berries a day and will swing into operation to catch the ball as soon as prices on fresh berries begin to fall after the peak of the crop hits the market. A new market entirely will be served with the frozen product. The berries will be packed in 30-pound tins for sale to hotels, preservers who make jams, and to the armed forces, the principals said.

Frozen Food Sales

RETAIL SALES of frozen foods "probably will top" $2 billion this year, W. A. Bowen, president of Eastern Frosted Foods Association, predicted. He estimated 1954 frozen food volume at between $1.7 billion and $1.8 billion. Mr. Bowen addressed a luncheon of the Advertising Club of New York described as a "salute to the frozen food industry." George Mentley, president of the National Association of Frozen Food Packers, forecast production of 65 million pounds of fish sticks this year.

North Atlantic Chapter Meets at Annapolis

WITH approximately 65 in attendance, a sizable portion of NARW's North Atlantic Chapter sat down to two days of helpful and informative discussion at Carvel Hall, Annapolis, Maryland, May 19 and 20. Features of the meeting were round table discussions, addresses by Lt. Col. Marshall Dickson on QMMC activities and Major Gen. Herman Feldman, Executive Vice-President of the QM Assn. The latter explained the functions of the QMA and urged NARW members to take advantage of membership in this strategic and fast growing organization.

More features of the meeting were provided by President Newell, Vice-President Stecker, Legislative Chairman Johnson and Wm. Dalton, who served as a panel on legislative and labor problems. Another favorable feature was a panel and open discussion entitled "Problem Clinic" with well known operators from the Chapter area leading the discussion and "on-the-spot" answers. The "doctors" were suitably dressed in operating gowns.

The meeting was presided over by Chairman P. D. Burrill, Boston, Mass., and Vice Chairman John J. Byrne, New York City. H. C. Diehl of The Refrigeration Research Foundation presented an "expose" of irradiated foods and NARW's Safety Program was discussed by Jack Keefe of Bridgeton, N.J. Armour and Company presented its new "Frosted Packaged Meats" film.—NARW Cold Facts.

Frost on Refrigeration Coils to be Studied

A NEW project, concerned with the formation of frost on refrigeration coils, has been approved by the Executive Committee of The Refrigeration Research Foundation, and initiated at the University of Illinois. It will involve engineering studies on factors that affect the efficiency of operation of coils. This particular phase of refrigeration engineering is one that deserves advanced investigation; it may be possible to discover ways to make important savings, as well as to increase efficiency, according to a statement by the Director.

Prof. W. F. Stoecker will be the immediate supervisor. Prof. N. A. Parker, Head of the Department of Mechanical Engineering at the University of Illinois, will be the executive supervisor. The initial grant is $3,000.

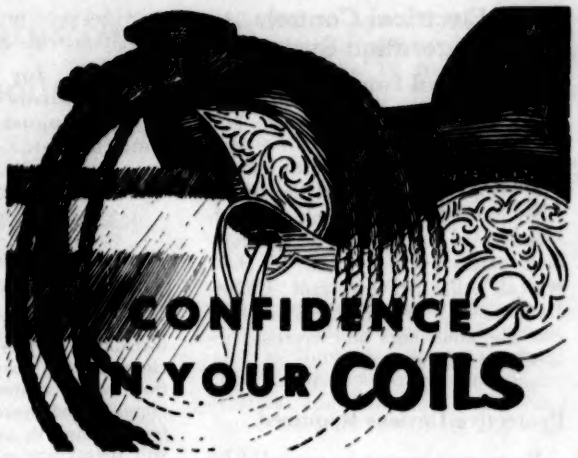
COMING CONVENTIONS

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 8-10, 1955
Ambassador Hotel, Los Angeles, Calif.
J. RICHARD KELAHAN, Secretary

NATIONAL ASSOCIATION OF ICE INDUSTRIES
November 15-18, 1955
Biltmore Hotel, Los Angeles, Calif.
GUY W. JACOBS, Exec-Secy.

AIR CONDITIONING and REFRIGERATION EXHIBIT
November 28 through December 1, 1955
Atlantic City Exhibition Hall, Atlantic City, N. J.

DELTA STATES ICE ASSOCIATION
December 4-6, 1955
Buena Vita Hotel, Biloxi, Miss.
MRS. EDNA VAUGHAN, Secretary



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offer you the benefits of over 70 years' specialization in the pipe-bending field: experienced engineering and exact production, with smooth bends, perfect welds, and accurate measurements.

Whenever you need coils, write for our free tracing-chart which shows standard dimensions ready to fill in. It will simplify your specifications—whether for zig-zag or nested box or conical or round-flat or reducing coils.

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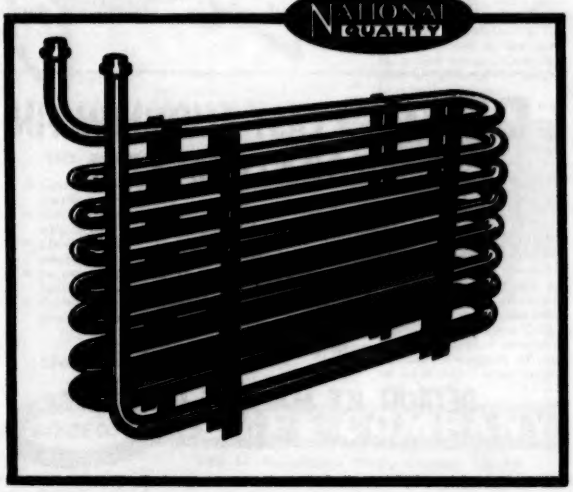


Basic Electrical Controls For Refrigeration Systems

(Continued from Page 36)

As described previously, the preceding illustrations have shown schematic representations of equipment. The actual appearance of the equipment is markedly different, although identical as to function and component parts. Fig's. 15 and 16 show typical Allen-Bradley and Cutler-Hammer full voltage, magnetic starters. The contactors and overload relays are indicated.

Protective Devices Required

Every starter must be preceded by a fused disconnect switch, or a circuit breaker, or equivalent. Fig. 17 shows a fused disconnect switch tied into the power line before the starter. The function of the disconnect switch, which is one of the functions of a circuit breaker is to isolate the starter from the power wires so that service or maintenance can be performed on the starter with no risk to human life or safety.

Function of Fuses

Function of the fuses, which is the other function of a circuit breaker, is to protect the motor starter, and wires from short circuits or electrical faults. The overload relays in the starter previously described, are extremely sensitive to any currents above normal; however, they are relatively slow to operate and therefore, unsatisfactory for the quick responses required by short circuits. Fuses or circuit breakers, on the other hand, operate very quickly to interrupt short circuit currents or a current greatly in excess of that required for normal motor operation. The combination of fuses and overload relays provides good protection to the motor for all currents above normal.

Watch for discussion and basic controls wiring diagrams in the August INDUSTRIAL REFRIGERATION.

Question Box

(Continued from Page 51)

Seeks Device For Detecting Ammonia In Condensing Water

QUESTION NO. 1056: Is there an instrument either electrical or mechanical that may be installed in a fresh water system, in particular ammonia condensers where there are four or five in use at all times, that will detect ammonia present in fresh water. It would be appreciated if I could get the names of the manufacturers if there is such an item.—T.E.McC, San Francisco, Calif.

Wants Description On Use Of Watt-Hour Meter

QUESTION NO. 1057: Would Chief Engineer Rouse (Northland Center, Detroit) care to describe how watt hour meters are used to reconcile meter readings for tenant chilled water uses at Northland? (See INDUSTRIAL REFRIGERATION, January, 1955)—F. H., St. Louis, Mo.

Complains of Problem With Tobacco Plant Humidistat

QUESTION NO. 1058: In our cigar factory we attempt to maintain 70 F dry-bulb temperature with 70 percent relative humidity. An air washer system is used. In winter and during mild weather the temperature is controlled by a thermostat which operates a damper and a steam coil in the by-pass duct over the washer. The humidity is controlled in winter and during mild weather by a humidistat which controls the outdoor air and return air dampers. In summer the humidistat controls the water temperature in the washer. The temperature control is satisfactory, but the humidistat action is somewhat erratic and slow probably due to tobacco dust settling on the sensitive hairs in the humidistat. How can this be corrected?—P.C., W—S, No. Car.

NARW Officers Plan Program of Work

A SPECIAL meeting of the officers and staff of the National Association of Refrigerated Warehouses was held at Washington May 17 to discuss immediate Association and industry problems and a proposed expansion of activities and services to be provided NARW members by the Association.

Major emphasis will be on the industry's legislative-industrial relations activities; the steadily increasing growth of the refrigerated warehouse industry and its growing impact on the nation's food economy; and proposed increased services to the Association's growing membership. NARW officers attending the meeting were: F. D. Newell, Jr., Minneapolis, President; G. J. Stecker, Louisville, Vice President; and William Ready, Indianapolis, Treasurer.

The new officers also attended the Spring Meeting of the Association's North Atlantic Chapter at Carvel Hall, Annapolis, May 18—20.

Adds Refrigerated Storage

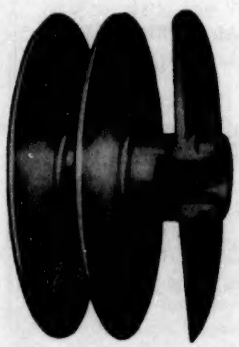
A PROGRAM of modernization and new construction including new refrigerated storage is nearing completion by Bissinger & Company, Los Angeles, Calif. The Bissinger Company is engaged in the buying and selling of cattle hides and this year celebrates its diamond anniversary.

DIMCO CAST ALUMINUM FIN EVAPORATING COIL

The Ideal Refrigeration Surface for Cold Storages, Freezer Plants, Dairy Products, Packing Houses, Abattoirs, Breweries and numerous applications

DETROIT ICE MACHINE COMPANY

2613 Twelfth St., Detroit 16, Mich.



★ Saves Space
★ Saves Weight
★ Saves Cost

CAN BE USED WITH ANY REFRIGERANT

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Merchants Refrigerating Completes New Addition to Hopkins Warehouse

Drawing of Merchants refrigerated warehouse at Hopkins, Minnesota, with new addition

AN ADDITION to the Merchants Refrigerating Company's warehouse at Hopkins, Minnesota, was expected to be completed and in operation about June 15, 1955. As the picture shows, the addition is at the east end of the present building. The original building which was built in 1951 has 1,750,000 cu ft. of refrigerated space and when the addition is completed, it will contain over 3,000,000 cu. ft. of space.

The type of construction is the same, one story, steel reinforced concrete, glazed tile, automatic sprinkler with ADT alarm and ADT burglary protection. The addition will have both cooler and freezer space. The added space will have sections for tenant rentals, which will include refrigerated and non-refrigerated space, as well as private dock space and office space for each tenant. Inasmuch as the addition is a continuation of the present building, the blast freezers in the present plant can service any tenant operation in the new building and likewise tenants in the present plant. Two hundred thousand pounds of fresh product can be blast frozen every 24 hours.

With the added space, the warehouse will have facilities for loading and unloading 52 trucks at one time, while the rail dock will be expanded to approximately 800 ft and will be able to handle 19 freight cars at one time.

Arthur N. Otis is president of the company with headquarters at 17 Varick Street, New York. The company also operates warehouses in New York City, Buffalo, N. Y., Newark and Jersey City, N. J., St. Louis, Mo., and Modesto, Calif. Edwin M. Neylon is vice president and territory manager of the midwest territory and John B. Frane is plant manager at Hopkins. Knutson Construction Company were the general contractors and Magney, Tusler and Setter were the architects and engineers.

New Toledo Warehouse

A MARINE terminal and warehouse, which will include some air conditioned and refrigerated rooms for perishable items, will be erected on the Maumee River Toledo, Ohio and will be operated by the D. H. Overmyer Warehouse Co. It will cost about two million dollars. To be built of reinforced concrete, the new warehouse will contain 100,000 square feet of space beneath its 22 foot high ceilings.

NEW

LOW COST ICE CRUSHER

All-Steel Crusher For 25 Lb. Block Ice Crusher

. . . Ideal for Ice Stations —Vendors and Small Stores . . .

Grinds 25 lb. block in 25 seconds with grate closed.

Four grate adjustments give crushed ice from "pea-size" to 1½" chunks by merely turning grate handle on side of hopper.

Galvanized for prevention of rust.

All-steel shell, legs and grate handle.

Belt driven, no gears, and self-aligning ball bearings.

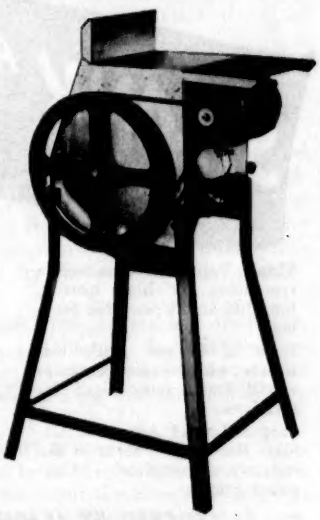
Chute for filling containers.

Safety-shelf for block ice to be placed before entering crusher.

Guard covers flywheel, belt and motor pulley.

Only $125.00 with 1/3 HP motor.

Bateman 25 CROWN ICE CRUSHER



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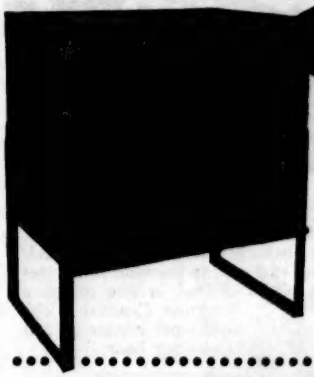
Bateman Ice Processing Equipment

MINERAL WELLS, TEXAS

THE ONLY AIR-COOLED CONDENSER WITH THESE 2 ESSENTIAL FEATURES

REMPE Atmos-Therm



1. DESUPERHEAT SECTION Special large volume gas inlet section. Hot gas from compressor expands slightly to accelerate its transfer from a dry gas to a wet vapor. Completion of change is made in smaller tubes.

THE REMPE "ATMOS-THERM"

- Completely eliminates the need for condenser water.
- Minimizes operating and service expense.
- Eliminates water supply and disposal cost.
- Is adaptable to inside or outdoor installation.
- Outlasts cooling towers and evaporative condensers.

Write for details and price.

2. AIR BLEEDER BAFFLE Allows stream of air to be directed over all return bends for maximum efficiency. Return Bend Cover Plate perforated to allow measured amount of air to be directed over bends and headers.

REMPE CO. REMPE COMPANY

348 N. Sacramento Blvd., Chicago 12, Ill.

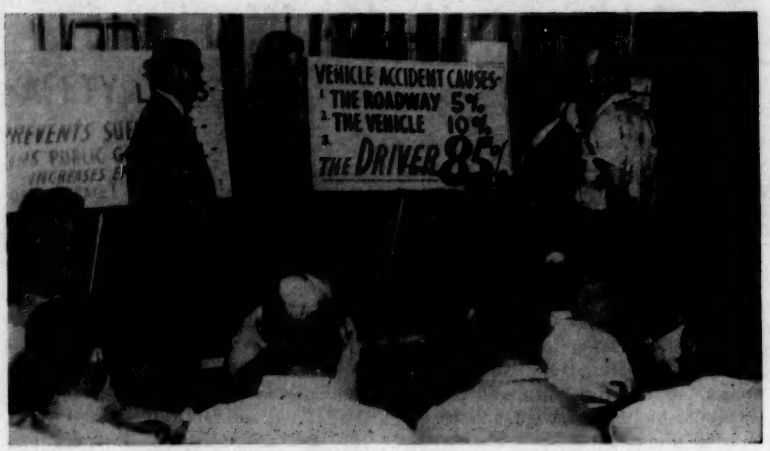
substantial ice market. In the main, the big transport will be utilized to service 14 automatic vendors throughout the territory, with occasional use for dealer servicing in other outlying communities.

Capable of high speed operation, and of maintaining ideal temperatures during the warm summer months, the new tractor-trailer unit will be confined to long distance haulage, while a smaller truck, already in service, will service automatic vendors in the city limits.

TRRF Graduate Fellowship

A GRADUATE fellowship in commodity refrigeration science has been established by The Refrigeration Research Foundation to aid a qualified graduate student for a year while he is engaged in research at an institution here or abroad. Plans for administering and granting this fellowship remain to be developed. In honor of the TRRF Board Chairman, this fellowship is called The Samuel Cate Prescott Fellowship. It Commemorates the distinguished services of Dr. Sam Prescott as Scientist, humanitarian and leader in research and research administration over many years.

Southland Drives Home Need For Safety

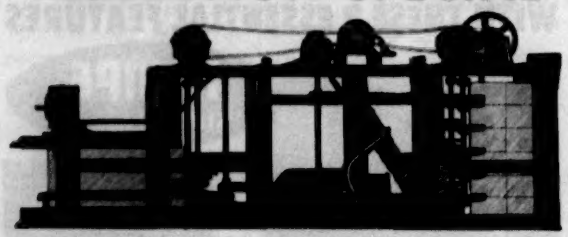


Waco ice employees hear lecture on the need for safety. Standing: Coy Argo, Waco manager; Patrolman Nulls; W. F. Leonard Jr.; Ennis Boyette.

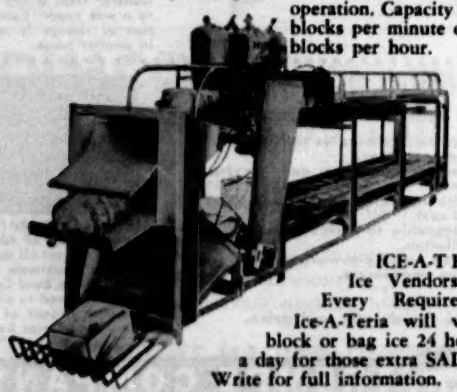
A SAFETY meeting of the Waco ice employees of the Southland Corporation, held at Waco, Texas, Friday evening April 8, drew a good attendance and a high rate of interest.

Feature of the meeting was a talk by Patrolman Nulls of the traffic department, Waco police force. He discussed local traffic situations, bad intersections, speed, following too close, obeying traffic signals, and other regulations. He was followed by W. F. Leonard Jr. safety director for Southland, who showed some twenty charts based on driving conditions in Waco. Patrolman Nulls said he had never seen a Southland driver violate a traffic law.

PERFECTION SPECIAL



The PERFECTION SPECIAL receives ice blocks on edge, scores them lengthwise first. Then heads up the blocks, scores them crosswise and discharges them standing on end. This is a combined heading and scoring machine and scores the blocks into any size pieces desired in one complete operation. Capacity is 4½ blocks per minute or 270 blocks per hour.

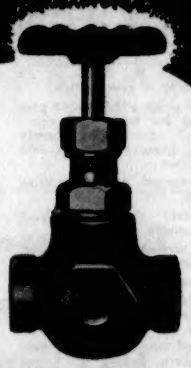


ICE-A-TERIA
Ice Vendors For Every Requirement.
Ice-A-Teria will vend block or bag ice 24 hours a day for those extra SALES! Write for full information.

PERFECTION ICE SCORING MACHINE CO.
P.O. Box 2140, Fort Worth, Texas

Efficient Designs For Long Life And Low Maintenance

SHANK AMMONIA VALVES



Shank Valves have earned a reputation for high quality, long life and dependable products.

Built of highest grade materials with close tolerances —will stand most rigid inspections.

Largest line of Ammonia All-Steel Bar Stock Valves in the industry. Completely Cadmium plated.

STOCKED BY LEADING JOBBERS

Shut Off Valves · Gauge Sets
Line Valves · Relief Valves
Three Way Valves · Expansion Valves
Steel Purge Valves
Write for Catalog

CYRUS SHANK COMPANY

4650 WEST 12TH PLACE CHICAGO 50, ILLINOIS

Talks at Rotary Club Build Interest in Safety

A SIGN at each end of Mineola, Texas was mentioned at one of the regular Rotary Club meetings, with this lettering: "Drive Safely, This City Cannot Spare a Child." This stemmed from a message given by W. F. Leonard, Jr., director of safety and insurance for Oak Farms Dairies of Texas. Mr. Leonard spoke to the Rotary Club and also to the Junior high school and high school students of Mineola.

Statistics from the United States, Texas, and city files were shown, citing the fact that traffic accidents are rapidly on the increase. Statistics from the nation showed that in 1953, 95,000 people were killed in accidents, and cost of these amounted to nine million dollars, enough money to build one million six-room homes.

Mr. Leonard also conducted safety meetings recently for the Civic Club of South Austin, the Fort Worth Chapter NAPRE, the Texas Pond Order of the Blue Goose, Dallas, the Sanitarians of the city of Fort Worth, and others.

In Texas, 223,392 wrecks occurred in 1953 and 2,363 people were killed. Cost of these accidents was 150 million dollars; just think how many hospital rooms, polio clinics, or even orphan's homes could be built with that money, Mr. Leonard stated.

Figures show that 45 percent of the accidents occur on the road from speed. In Mineola last year, right-of-way mixups caused the most number of auto accidents, signal light violations were next, speed third, incorrect hand signals fourth, and follwing too closely, fifth.

Over a period of 48 months in Dallas, a survey of 200 students was made. These had driver education, and 28 were tagged with traffic violations over this four-year period. Two hundred more students were checked, these not having driver education, and they were issued 478 tickets.

Mr. Leonard well known for his safety work in the refrigeration industry is currently serving as membership chairman of the Food Section of the National Safety Council.

Asks Licensing for Air Conditioning Installations

MEMBERS of the Virginia Plumbing, Heating and Air Conditioning Contractors' Association are advocating enactment next year of state legislation setting up a new State Examining Board for their industry. The proposed bill to create a seven-man state board to license contractors was reviewed by the group in its monthly publication.

"Many thousands of colds," the group said, "are the result of improper heating installations. In addition, unsuspecting owners waste many thousands of dollars each year on improper plumbing, heating and air conditioning installations."

Refuting the general belief that anyone who can screw pipe together is competent to do the work, the association said, "safe and economical installations require technical knowledge . . . which can be obtained only through careful study and long, practical experience."

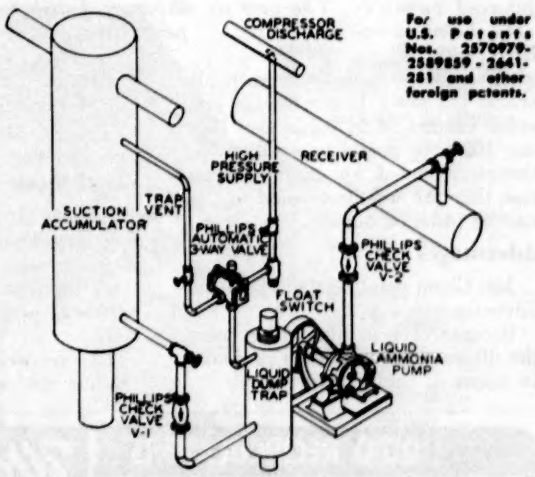
The proposed board would include a licensed professional engineer, a health doctor, a sanitary officer, an engineering professor in a state-supported college and three members of the plumbing, heating and air conditioning industry. The cost of the board, the group explained, would not be a burden because fees collected for giving examinations and renewing certificates would cover the expense.

Ammonia "Slop-Over" Handled Automatically by PHILLIPS Liquid Return System

Protects Compressors, Saves Power, Makes Defrosting and Maintenance Simpler

Even in the best designed refrigeration systems, ammonia "slop-over" is a common occurrence. Two stage compression systems, booster systems and control ammonia compression systems subject to fast temperature and pressure changes are especially likely to have liquid in suction lines. This condition can seriously damage compressors which should handle dry gasses only.

Engineers at H. A. Phillips & Co. have devised a system that automatically returns "slop-over" directly to the receiver without regenerating and re-condensing the liquid. As shown in the drawing below, the Phillips Liquid Return System takes liquid ammonia which has collected in the accumulator, drains it through an outlet valve and check valve (V-1) into a liquid trap. Drainage occurs when the trap is at a low pressure. The trap is vented to the accumulator through a three-way valve and vent line. As the trap fills, a float switch is activated, energizing a three-way valve. This valve closes the vent line and connects the compressor discharge to the trap. Pressure builds up in the trap and closes check valve V-1. Pressure in the trap then reaches the same pressure as the receiver, opening check valve V-2 and allowing gravity to carry the liquid to the receiver. If gravity flow is not possible, a liquid ammonia pump is used. High pressure at both the pump inlet and outlet prevents flashing the liquid into gas. When the liquid trap is empty, the three-way valve is de-energized, closing the high pressure line to the trap. The trap is again vented to the accumulator, allowing liquid to drain once again into the trap.



Phillips Liquid Return System

This arrangement is highly efficient since only one pound of compression gas is required to move 25 pounds of liquid. There is practically no loss of refrigeration potential of the recovered liquid. The system also permits oil flushed into the accumulator to be easily drained.

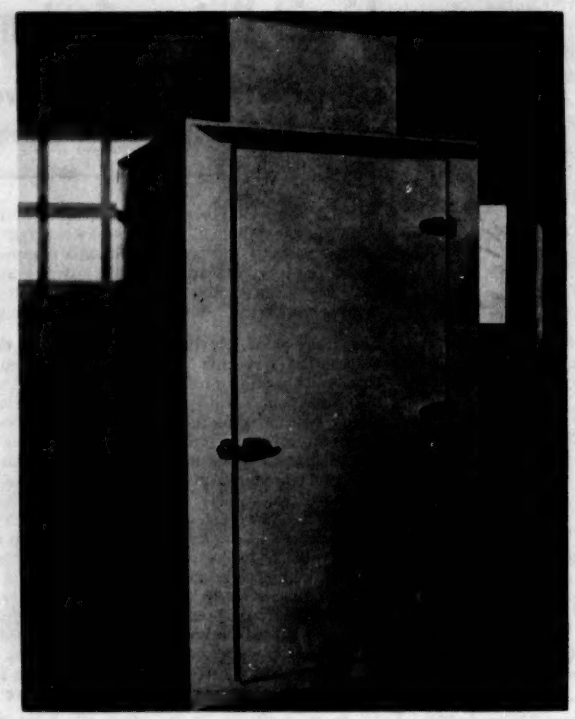
A number of "packaged" variations of this system in capacities to 1000-tons are available to handle all arrangements of accumulator and receiver locations. For full details, write . . .

H. A. PHILLIPS & CO.

DESIGNERS AND ENGINEERS
REFRIGERATION CONTROL SYSTEMS
3255 W. Carroll Ave. • Chicago 24, Illinois

Ice Dispenser Offers Outlet for Ice In Rural Locations

AN ICE dispenser, built to specifications by a local manufacturer, has been designed by John Glenn, Glenn Ice & Fuel Company, Beardstown, Illinois. Twenty-five of these cabinets have been placed for the resale of ice in filling stations, motels, super markets, ice cream stands and other places. They have met with ready acceptance and Mr. Glenn expects to give the project a good tryout during the 1955 ice season.



The new ice dispenser distributed by Glenn Ice Company, Beardstown, Illinois.

The cabinets are zinc coated, steel construction, 41¾ × 42 × 88 inches high, with two reinforced removable shelves, insulated with Fiberglas, Servel supermetic hermetically sealed 1/3 ton F-12 condensing unit, cubic content of 44 cubic feet, holding 102-12½ pound bags of ice. Although intended for inside installation they are weatherproofed so they can be installed outside.

Advantages

Mr. Glenn points out the following advantages:

Because of low initial investment, the dispensers can be used profitably in towns of under 2,500 people.

Because of low weight (663 pounds) cabinets can be easily moved to test out possible ice vending station locations.

Small Space Needed

Because of the small space required for installation (42 x 42 inches) the units can be installed where space for a vending station is not available or where prohibited by zoning barrier.

To support and surround present vending station locations.

Convention-Vacation Time

(Continued from Page 46)

vestments in excess of 300 million dollars annually.

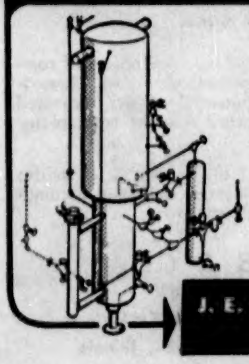
Foodstuffs industry has led the field of 17 major industries in capital investment in Los Angeles County with much invested in that all important utility to food processing and storage, refrigeration. Pointing up the increasing importance of the Los Angeles metropolitan area to the nation's economy, a recent survey showed that more than 300 nationally-known companies operate branch plants in Los Angeles now and the number is growing daily. Leading the nation in the manufacture of aircraft and aircraft parts, *pumps and compressors, refrigeration equipment* and canned sea food, Los Angeles metropolitan area is second, nationally, in automobile tire and tube production and a host of other products including blown glass and jewelry. Its highways are among the nation's best (see Fig. 3).

Certainly Los Angeles has all the requirements necessary to inducing the more agressive and ambitious NAPRE member, to select his vacation-time to coincide with convention-time. Members of California No. 2 are even joined by their Brothers in No. 5, over in Colton-San Bernardino area, in promoting nation-wide attendance. Fig. 4 is typical of their geography. They invite a stopover enroute to or from Los Angeles.

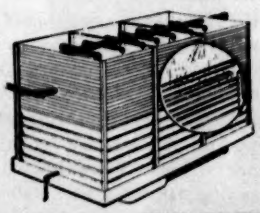
Kodak Park Uses Large Refrigeration System

THE KODAK, Park refrigeration system near Rochester, N. Y., one of the largest in the world, is used in the process of making film and film base, and for air-conditioning. It has a capacity of about 33,000 tons of ice per day. Five different temperatures are supplied by the 17 refrigeration units.

LIQUID RECIRCULATORS Watkins EVAPORATIVE CONDENSERS



- Full-flooding guarantees high efficiency.
- Excess cold liquid is recirculated to evaporators.
- Protects compressor from slugs.
- Oil separator is built in.
- Permits complete hot-gas defrosting in just minutes.
- No fans. No blowers.
- Uses less than 5% of water used in shell-and-tube condensers.
- Carries high overloads.
- Low first cost.
- Low maintenance cost.
- Very low operating cost.



"THEY FOLLOW THE WEATHER"

Write for bulletins, specific data for your individual system.

J. E. WATKINS CO.—307-A LAKE ST.—MAYWOOD, ILLINOIS

REFRIGERATION EQUIPMENT FOR MORE ECONOMICAL OPERATION

Chapter Activities

(Continued from Page 43)

New York, Department of Hospitals, made Sarkar's remittance of dues together with a note that Mr. Sarkar is in London, England, at the present time. H. Henfield also remitted from Bombay, India, Nathan Feldman from Haifa, Israel, Arthur W. Stedman from Frankfurt, Germany, and J. O. P. Mumford from London, England.

New Members Introduced

More than a dozen engineers have been added to this division of membership recently. We are pleased to have William H. Turnbull of E. P. Higley & Company, Mason City, Iowa; W. W. Roberds, Houston, Texas; John Weidenfeller, who heads up his own refrigerating firm, Weidenfeller Engineering Company, Grand Rapids, Michigan; J. N. Raybould, chief engineer, the Sheraton-Brock hotel, Niagara Falls, Ontario; Wm. J. Lennon, chief engineer, Sheraton-Biltmore, Providence, R. I.; George Henderson, building superintendent, King Edward hotel, Toronto, Canada, and Edward A. Challandes, Marlborough, New York.

Other new members include H. Thomas Dewhirst, manager, House of David Cold Storage, Benton Harbor, Michigan, Ray Goodfellow, plant superintendent, Maurer-Neuer Meat Packers, Arkansas City, Kansas, and Richard M. Kirby, chief engineer Fairmont Foods Company, Crete, Nebraska.

Three new members in Denver have been accepted by our board of directors. They are Edw. H. Merritt, Bert F. Chase and Rodger S. Caldwell, all three are engineers of Safeway Stores Distributor Center with Marcus A. Florida, M-at-L. These gentlemen have inquired into the prospect of forming a chapter in their locality also. We sincerely hope that they are successful in their endeavors.

NARW Safety Committee Improves Record

An estimated 12,508 working days, or $160,000, was saved over a two year period in the refrigerated warehouse industry as a result of a concentrated Industry Safety Program conducted by the National Association of Refrigerated Warehouses.

Drive Brings Results

Starting from scratch in 1953, NARW and its Safety Committee, under the chairmanship of A. R. Carstensen, Sacramento, California, launched an intensified drive to cut down the industry accident rate. As a result, at the end of a two year period of safety campaigning, the industry's Frequency Rate (number of reportable injuries per million man hours worked) had dropped 17 percent and its Severity Rate (total time charges per thousand hours worked) had dropped 32 percent. In 1952, the industry's Frequency Rate was 38.85, and its Severity Rate was 1.84. In 1954, these figures had dropped to 32.064 and 1.24.

Translated into injuries prevented and man hours saved for the two year period as a result of NARW's Safety Drive, these are the results:

Total Injuries Prevented.....960
Total Lost Time Injuries Prevented.....96
Total Lost Time Working Days Saved.....12,506
Total Dollar Savings in Wages.....$160,000

The Safety Program is moving forward constantly and NARW and its Safety Committee are determined to keep pushing until effective and active safety programs are in force in every member plant; thereby showing even greater reductions in the industry's Frequency and Severity Rate. It's NARW's intention to "freeze" safety in every member refrigerated warehouse, to make it a permanent part of every warehouse operation.

ARMSTRONG PURGER SAVES $500 FOR ICE CREAM PLANT FIRST YEAR OF OPERATION

Mr. H. L. Cooke, Plant Superintendent of the Howard Johnson Ice Cream Manufacturing Plant in Baltimore, Maryland, reported his plant saved $500.00 in ammonia the first year after installing an Armstrong Forged Steel Purger.

Armstrong Purgers automatically remove all non-condensable gases from refrigeration systems without excessive waste of refrigerant. As a result: refrigerant costs are lower, head pressures are reduced, cooling water consumption is lowered, power costs are cut and valuable time is saved. For full details, write:

ARMSTRONG MACHINE WORKS
860 Maple St., Three Rivers, Michigan

Ask for Bulletin No. 221

ARMSTRONG
FORGED STEEL PURGERS
SATISFACTION GUARANTEED

Polar
AUTOMATIC ICE VENDORS

• Shipped ready to work for you.

REFRIGERATION ENGINEERING COMPANY
MONTGOMERY • MINNESOTA

Shell-Ice Maker Offers New Way of Making Convenient Ice

THE Frick Company has developed the Shell-Ice Maker designed to make ice in the form of layers ⅛ to ½-inch thick. It consists of a series of stainless-steel tubes, suspended vertically and cooled inside with direct-expansion ammonia or Freon. Water is kept flowing down the outside of the tubes, its motion providing sufficient agitation, with reasonably good water, to make clear ice. (A brief description was published in the January INDUSTRIAL REFRIGERATION, page 6).

After the ice is frozen to a thickness of ⅛ to ½ inch, as desired, the water and the cold refrigerant are automatically shut off, and warm ammonia or Freon is admitted to the inside of the tubes by a special arrangement that thaws the bottoms of the tubes first. The release of ice from a chilled surface by the use of a warm refrigerant is old practice, but former methods involved excessive heat losses and delays in time. The method used with the Shell-Ice Maker provides practically instantaneous removal of the cold refrigerant from the tubes, with a minimum of heating of the liquid refrigerant, and has also gotten away from other thermal losses; the time required for harvesting the ice has been reduced to seconds. When the ice is released, it slides rapidly down the tubes by gravity, passing over a breaker on its way to the bin or storage room.

The action is so fast that ice ¼-inch thick is frozen and harvested in cycles of 10 minutes or less! The tubes are usually four inches in diameter, and a ton of ice is produced daily from every 9 or 12 feet of tube length, depending on the temperature used. If the tubes are kept very cold they will naturally produce more ice, but at the risk of some clouding.

Shell-Ice does not include any scrapings, snow, or other waste. The slightly curved pieces are irregular in shape and size and have no dangerously sharp edges. They are small enough to pack closely around foods, but are large enough for effective cooling. Shell-Ice weighs about 34 lbs. per cubic foot, and with average good water is clear, hard, and solid. It can be shoveled, scooped, conveyed, blown through a hose, or handled by gravity through a chute. It can be packed in bags and sold like sized ice.

Pouring shell-ice from a paper bag after it had been in storage several weeks.

The ice maker is of steel construction. Its operation is completely automatic, and calls for only an occasional inspection. It can be placed either near or at a distance from the refrigerating machine room. It takes up small floor space; the 20-ton machines measure 8 ft. 2 in. long, 5 ft. 6 in. wide, and 18 ft. 2 in. high. They are built in 12 sizes, with capacities of ½ to 30 tons per 24 hours. The design is protected by patent applications.

The largest use of shell-ice promises to be for cooling drinking water and beverages, but it is equally well suited to icing poultry, bottled milk, seafoods, and fresh produce or fruits.

Shell-ice being applied to bottled milk before distribution to delivery routes.

Shell-ice maker on a test run in the Frick research laboratory at Waynesboro.

News of People

Fairmont Canning Company Promotes Cutting

TELBERT CUTTING is now superintendent of Plant No. 3, Fairmont Canning Company, Winnebago, Minn., as announced in June by R. D. Montgomery, plant and field manager for the firm, from their headquarters at Fairmont, Minn. Mr. Cutting has been the chief refrigeration engineer at the Winnebago plant. He started working for Fairmont in 1941 and has risen to his present position through various positions in construction, maintenance and operation of the company's refrigerating systems, under the direction of B. E. Smith, superintendent of refrigeration.

Telbert Cutting

Weatherford Joins Texas Meat Staff

NEW chief engineer at Texas Meat & Provision Co., Lamarr St., Dallas, is Tom Weatherford, Jr.

Tom Weatherford, Jr.

Weatherford is a National Director of NAPRE and past president, Dallas Chapter. He goes to Texas Meat from Alford Refrigerated Warehouses, where he had been chief engineer of the Cadiz St. Plant, Alford's unique and somewhat controversial structure completed in 1949. Prior to joining Alfords, ten years ago, Weatherford had been on active duty with the U.S. Navy. He is a member of ASRE.

WM. C. DALTON, NARW executive vice-president was installed recently as vice-president of the Washington Trade Association Executives, an organization composed of several hundred Washington trade association managers, in almost as many industries.

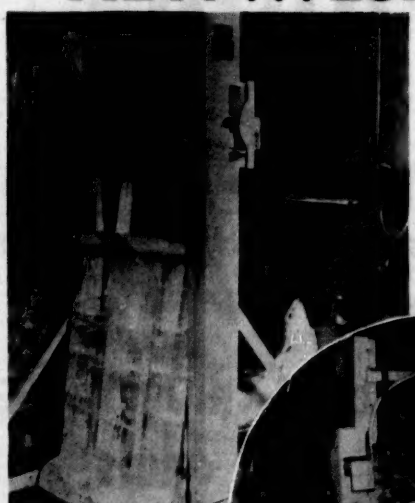
DEATHS

John C. Belz

THE DEATH of John C. Belz, president of the Standard Ice Co., Philadelphia and Glen Willow Ice Manufacturing Co., Manayunk, occurred June 8 at his home, 386 Penn Rd., Wynnewood, Mr. Belz also was a vice-president of the Mutual Guarantee Association, a director of the Home Life Insurance Co. of America and a member of the Philadelphia Country Club.

NEW . . . ESKIMO POWER LIFT

FOR YOUR PRESENT CRUSHER



The Eskimo power lift is engineered to fit in with most of the present crushing equipment in use. It speeds up your crushing and sizing operation by eliminating the lifting of ice by hand into the crusher.

Eliminates back injuries due to strain of lifting — No more ice tongs into the crusher — no more mashed toes — more crushed ice per hour.

This unit requires very little space and is designed so that, in sizing operation particularly, you may run the lift down when there is still about 100 lbs. of ice to be crushed. You may put the next block of ice on the power lift and have it in position before your crusher is empty. Height easily adjustable to your needs. Parts coming in contact with ice are galvanized for sanitation.

See this and other advanced labor saving ice equipment in
CINCINNATI, NOV. 9-12
Natl. Assn. of Ice Industries Convention

BALLARD
SALES COMPANY

SOLD BY BALLARD SALES COMPANY

"One Call for All"
Top Quality Ice
Equipment & Supplies

P.O. BOX 1121, FORT WORTH, TEXAS

MANUFACTURERS' NEWS

Taylor Occupies New West-Coast Plant

TAYLOR Instrument Companies announces that on May 1, 1955 its San Francisco offices and plant were moved across San Francisco Bay to 1661 Timothy Drive, San Leandro, Calif. Decision to relocate the plant and sales offices was made on the basis of a greatly increased volume of sales and service activities in in the San Francisco area.

The new plant has much better facilities and equipment than have previously been available in the San Francisco area, a company spokesman said. He stressed that it is capable of duplicating many manufacturing and repair techniques followed in the company's main plant in Rochester, N. Y. Set up to make repairs and assemble new instruments, it contains 16,800 square feet of floor space, a substanial gain over the quarters formerly occupied, has extensive parking facilities, and is centrally located.

Full page charts showing friction loss for the incompressible flow of viscous fluids for pipe sizes from ½ inch through 12 inches have been redrawn for greater clarity. Included are three fold-in charts of friction factors with related data to permit the calculation of friction loss for any fluid (liquid or gas) in any size or shape of conduit. Of particular utility are numerous examples showing actual mathematical solutions of pipe friction problems. An essential tool for hydraulic engineers, the Manual is also an excellent text of assistance to collect instructors and students. Its size is 8½ x 11 inches, paper bound, 87 pages.

York Corporation Report

SALES and earnings of York Corp for the six months ended March 31 were reported off substantially from the like period in the preceeding year. However, Stewart E. Lauer, president, noted there was a sharp improvement in orders for quick shipment beginning in February. He added that March reflected this change with net ernings of $585,000, about 69 percent greater than a year ago. "We expect this general improvement to continue throughout the third quarter," he said.

For the six months ended March 31 York netted $95,800, compared with earnings of $1,155,015 in the like period of fiscal 1954. Gross sales were nearly $32.3 million, compared with $44.4 million in the first half of fiscal 1954. For the three months ended December 31, a net loss of $392,779 was reported.

"Our present forecasts indicate that sales of air conditioning and refrigeration products and systems in fiscal 1955 should equal or exceed this same class of business reported last fiscal year," Mr. Lauer stated. He said York's manufacturing employment has increased by 1,175 since early February and is continuing to climb. York had an average of about 4,500 employees in 1954.

Superior Adds Warehousing Facilities in South

NEW WAREHOUSING facilities have been established in Atlanta, Georgia by Superior Valve & Fittings Company, it was announced by George R. Allen, vice-president.

"The warehouse is located at the new headquarters of the Austin L. Brown Company, 732 Spring Street NW, and is designed as a means of better serving our Southern wholesalers," Mr. Allen stated. "Although Superior has been represented in the South for more than 15 years, this is our first opportunity to expand our service through local warehouse facilities." The Atlanta warehouse will carry a complete line of Superior valves, fittings, driers, accessories, service tools and replacement parts ready for immediate shipment to wholesalers located in Georgia, Florida, North Carolina, South Carolina, Tennessee, Alabama and Mississippi.

Col-Flake

ICE MAKERS

LIMITED TIME OFFER

Complete with F12 Refrigeration and electrical controls

Up to 1 ton $1,750.00
Up to 1½ tons 2,200.00
Up to 2 tons 2,550.00

Above prices are f.o.b. Chicago, complete installation data. Supplied storage bin not included. Bin prices upon request.

Buy direct and save.

COL-FLAKE CORP.
2446 S. Ashland Ave.
Chicago 8, Illinois

Please send further information.

Name .....
Address .....
City ..... Zone .... State .....
I require ..... tons of ice per day.
Please have engineer call ☐

OHIO SPECIAL ICE CANS

WELDED — RIVETED

ICE CAN GRIDS

Industrial Trucks and Trailers

THE OHIO GALVANIZING & MFG CO

Recoy Products Co., Continues Manufacturing

RECOY PRODUCTS CO., is the new company name of Refrigeration Economics Co., Canton, Ohio and the Recoy line of unit coolers, evaporative condensers, shell condensers, air conditioning coils and units and fin coils will be manufactured by Recoy Products Co. 1232 — 2nd St., N.E., Canton, Ohio.

Management of Recoy Products Co. remains unchanged with Frank K. Bennett and Carl Weaver as principals of the company. Refrigeration Economics Co. has been disposed of and will continue as a wholesaler of refrigeration equipment, parts, and supplies.

CATALOGS AND BULLETINS

Catalog of Flexible Pipe Connections

A COMPLETE line of flexible pipe connections used to solve vibration and expansion control problems in industrial and process piping, is described in a catalog No. EZ-55, released by T. R. Finn & Company, Inc., Hawthorne, N.J., specialists in shock and vibration control. The stainless steel, welded diaphram-type, packless expansion joint described in the catalog is widely used for absorption of vibration, expansion and contraction in steam, chemical, oil and gas lines.

The catalog describes pressure and temperature ranges of application, lists dimensions and specifications, as well as illustrating the various types of special-purpose joints available. Complete selection factors and installation procedures are also given.

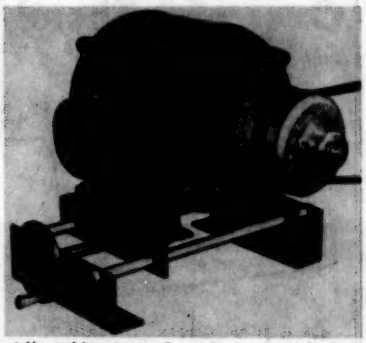
Solenoid Valves Bulletin

A NEW six page two-color bulletin covering the entire range of A-P Solenoid Valves has been issued by The A-P Controls Corporation of Milwaukee.

These valves designed for use with liquids, gases or refrigerants can be used for stop and start operations, mixing and blending metering or measuring, controlling pressure differential, controlling pressure, temperature and flow. Information on proper selection, features, coil construction, lift ratings, coil frequencies and liquid capacity and typical applications are listed in the new bulletin.

Installation Brochure For Variable Rate Pulley System

INSTRUCTIONS for selecting and installing variable speed pulley systems have been issued in a brochure by Equipment Engineering Co., Minneapolis, Minnesota, manufacturers of the Hi-Lo line



Adjustable motor base for use with variable speed pulley systems

of pulleys. Using proven formulas and tables, the company lists seven detailed steps in the process of securing the correct pulley system for the user's application. Complete tables and specifications on Hi-Lo systems are included, also charts to assist in the selection, with the horsepower section sub-divided into 1750, 1150 and 860 rpm.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings: $15.00 per inch for line listings.

USED EQUIPMENT—wanted & for sale

WANTED—Good used Ice crusher-slinger. Will trade either 8x8, 7½x7½, 6x6 compressor with starter and motor. John B. Fudickar, Concordia Ice Co. Inc., Ferriday, La.

CLOSEOUT OF COMPRESSORS—2 Frick 6 x 6 with Ideal 30 h.p. motor & 1 York 8 x 8 with 25 h.p. motor, condensers, receivers, all still hooked up as last used, only $2,000, for entire lot. 10 x 10 twin-cylinder single acting compressor, 150 h.p., 360 r.p.m. induction motor, used 2 years only, including condenser, receiver, traps, etc. still hooked up; York 11½ x 10, new 1947, with motor and all controls, still hooked up; 4 Niagara 110 ea. condensers, model 2585, still hooked up; all this equipment located in closed breweries we are dismantling. Available at real bargains. Contact Charles S. Jacobowitz Corp., 3080 Main St., Buffalo 14, N.Y. Telephone AMherst 2100.

FOR SALE — 15 ton York ice plant. 4 x 4, 5 x 5, 8 x 8, 9 x 9 York compressors. 10" x 7" Worthington booster. 15 ton shell condenser. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE—USED ICE PLANTS & REFRIGERATING EQUIPMENT

Complete Ice Plants 20 to 100 Tons
Ammonia Compressors, 3" x 3" to 12½" x 14½" Condensers, Cranes, Blowers, Scoring Machines, Ice Cranes—Various sizes. 100# — 300# Ice Cubers. Write or wire us on any equipment you may need.

ENTERPRISE EQUIPMENT CORPORATION
77-79 Alexander Street, Yonkers, New York
Cable Add: ENEGCO Phi.: Yonkers 8-8118-9

FOR SALE — 1344 feet of FINNED PIPE — 12' lengths. Made from 2" steel pipe with 7" fins-1½" apart. All heavily galvanized, brand new price $3.60 ft. West Side Cold Storage Co. 7 Harrison St., New York 13, N.Y.

FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 80 East Jackson Boulevard, Chicago 4, Illinois, WAbash 2-3299.

FOR SALE

10x10 York direct to 125 h.p., 360 rpm motor.
10x10 York direct to Unaflow steam engine.
9x9 York direct to 75 h.p. 300 r.p.m. motor.
9x9 Frick V-belt drive.
7¼x7¼ Baker V-belt drive.
5x5 York Ve-belt drive to 20 h.p. motor.
130 h.p. Superior Diesel engine 600 r.p.m.
(2) 18"x18' enclosed condensers with receiver.
Type 50 F & E cuber — Chester Jensen cooler, 100 ton cap. — Arctic Pownall ice lifting hooks (malleable iron) — ice breakers — brine coolers etc.

JOHN F. CARSON
"A" & Venango Sts. Philadelphia 34, Pa.
GArfield 6-2221

FOR SALE—4 x 4 Vilter, 6 x 6 Frick, 7½ x 7½ York, 8 x 8 Frick, 9 x 9 Frick, 10 x 10 Frick, 9½ x 9½ Vilter, Baker self-contained unit; ice plants, cans, cranes, agitators, blowers, coolers. Parke Pettegrew, 370 W. Broad St., Columbus 8, Ohio.

FOR SALE—two 12½x14½, 2 cylinder York compressors; one direct connected to 150 h.p., 164 r.p.m. synchronous motor and G.E. controllers; one direct connected to 175 h.p., 180 r.p.m. synchronous motor and G.E. controllers. Write P.O. Box 11246, New Orleans 13, La.

FOR SALE

1—GE Freon compressor, 4 cyl., #GM 1041 w/25 h.p. 3/60 220/440 volt motor.....$850.00
1—12 cyl. York compressor, Model VW 3129-9D E Freon 12 forced feed lubrication — compressor and base only with connecting coupling for direct drive $1750.00
1—Creamery Package ice machine #5989 8x8 ammonia compressor with grooved fly-wheel w/50 h.p. Century 3/60 220/440 865 r.p.m. motor w/starting equipment.....$1250.00
1—Worthington compressor 4 cyl. V type size CB 5000 W serial 97 4629 refrigerant F12 self-contained 3/60 220/440 volt 1165 r.p.m. V belt drive 60 h.p. motor complete with condenser $1175.00

AARON EQUIPMENT COMPANY
1347 S Ashland Ave. Chicago 8, Ill.
Phone CHesapeake 3-5300

Positions and Help Wanted

POSITION WANTED—Licensed Engineer—30 years experience in design, operations and supervision of steam, electric and Diesel and refrigeration plants. Desire position as Chief Engineer over one or a number of manufacturing plants. Resident Middlewest. Address Box JL-4, c/o Industrial Refrigeration.

SENIOR REFRIGERATION ENGINEER

Position open for refrigeration engineer, senior grade, for medium size cold storage warehouse with 100-ton ice plant. Applicant must be able to handle operating and maintenance personnel. State experience, age and education and salary desired. Reply to Mr. Charles A. T. O'Neill, President, Pennsylvania Refrigerated Terminals, Inc., Delaware & Oregon Aves., Philadelphia 48, Penna.

WANTED

COLD STORAGE INSULATION SPECIALIST

Excellent opportunity for experienced man in rapidly expanding field. Cold Storage Insulation Sales Engineer experienced in take-off, design assistance and execution of cold storage contracts, to manage cold storage department of Mid-West contracting division of national inorganic insulation manufacturer. Write, giving complete details of past experience. Your application will be kept confidential. Box JL8, c/o INDUSTRIAL REFRIGERATION.

433 GAS HAZARDS and How to Overcome Them!

As a practical help to anyone who is confronted with the problem of hazardous gases, mists, fumes, smokes and dusts, ACME offers this valuable Protection Guide. It lists 433 of these hazards along with the ACME Gas Mask Equipment designed to give you dependable protection in each specific case. This vital information is available exclusively through ACME. Write for your copy today.

ACME . . the Only GAS MASK with "Picture Windows"

You never have that "horse-blinder" feeling with the ACME Full-Vision Gas Mask. Its patented larger lenses provide full, natural vision with greater comfort along with protection you can rely on. Other ACME features include easier breathing, less fogging, and increased audibility. There's an ACME Mask to provide the right protection for every hazard such as those listed in the Protection Guide. Write for Bulletins 541 and 542 describing ACME canister gas mask equipment.

ACME PROTECTION EQUIPMENT COMPANY
1211 Kalamazoo Street, South Haven, Mich.

PIPE COILS

FABRICATIONS, Welded Headers or just single bends — whatever you need, our expert metalworkers can produce them to your exact specifications. Even in stainless steel, or up to 6 inch extra heavy. For quality work, backed by 37 years' specialization, call on us!

We'll gladly quote on your next job.

CHICAGO NIPPLE MANUFACTURING CO.
1997 CLYBOURN • CHICAGO 14

FRED OPHULS & ASSOCIATES

Consulting Engineers

112-114 West 42nd St. New York City 36

Industrial Power Plants
Refrigeration and
Cold Storage Warehouses,
Reports, Appraisals and Management

VAN RENSSELAER H. GREENE

ENGINEERS

COMPLETE PLANT DESIGNS INCLUDING BUILDING AND EQUIPMENT

11 PARK PLACE NEW YORK 7, N. Y.

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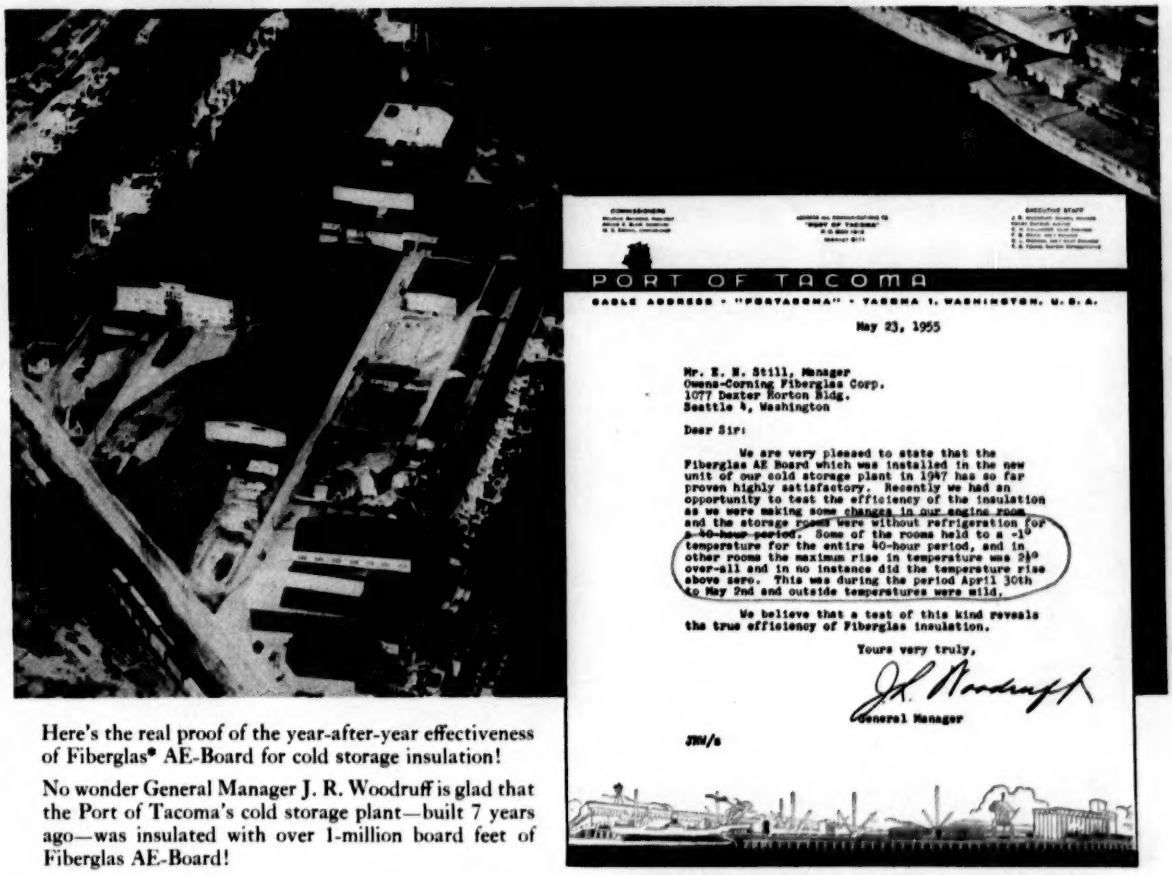
Port of Tacoma reports:

40 hours without refrigeration during balmy spring weather

But Fiberglas AE-Board—installed 7 years ago—holds temperature below zero for entire period!



PORT OF TACOMA

CABLE ADDRESS - "PORTACOMA" - TACOMA 1, WASHINGTON, U. S. A.

May 23, 1955

Mr. E. H. Still, Manager
Owens-Corning Fiberglas Corp.
1077 Dexter Horton Bldg.
Seattle 4, Washington

Dear Sir:

We are very pleased to state that the Fiberglas AE Board which was installed in the new unit of our cold storage plant in 1947 has so far proven highly satisfactory. Recently we had an opportunity to test the efficiency of the insulation as we were making some changes in our engine room and the storage rooms were without refrigeration for a 40-hour period. Some of the rooms held to a -1° temperature for the entire 40-hour period, and in other rooms the maximum rise in temperature was 2½° over-all and in no instance did the temperature rise above zero. This was during the period April 30th to May 2nd and outside temperatures were mild.

We believe that a test of this kind reveals the true efficiency of Fiberglas insulation.

Yours very truly,

J. R. Woodruff

General Manager

JRM/s

Here's the real proof of the year-after-year effectiveness of Fiberglas* AE-Board for cold storage insulation!

No wonder General Manager J. R. Woodruff is glad that the Port of Tacoma's cold storage plant—built 7 years ago—was insulated with over 1-million board feet of Fiberglas AE-Board!

As Mr. Woodruff has discovered, Fiberglas pays extra dividends in cold storage insulation because:

...it's made of inorganic glass wool entirely sheathed in asphalt to withstand widely different conditions of moisture and temperature.

...it not only offers insulating superiority, but because less thickness is required, Fiberglas makes extra storage space available!

FIBERGLAS

*T. M. Reg. Owens-Corning Fiberglas Corporation

For extra insulating efficiency—and for longer-lasting effectiveness—get all the facts about Fiberglas. It's the world's best-known insulation. Send in the coupon today. We'll be glad to rush you all the facts.

Owens-Corning Fiberglas Corporation
Dept. 185-G, Toledo 1, Ohio

Please send me the literature I have checked below:

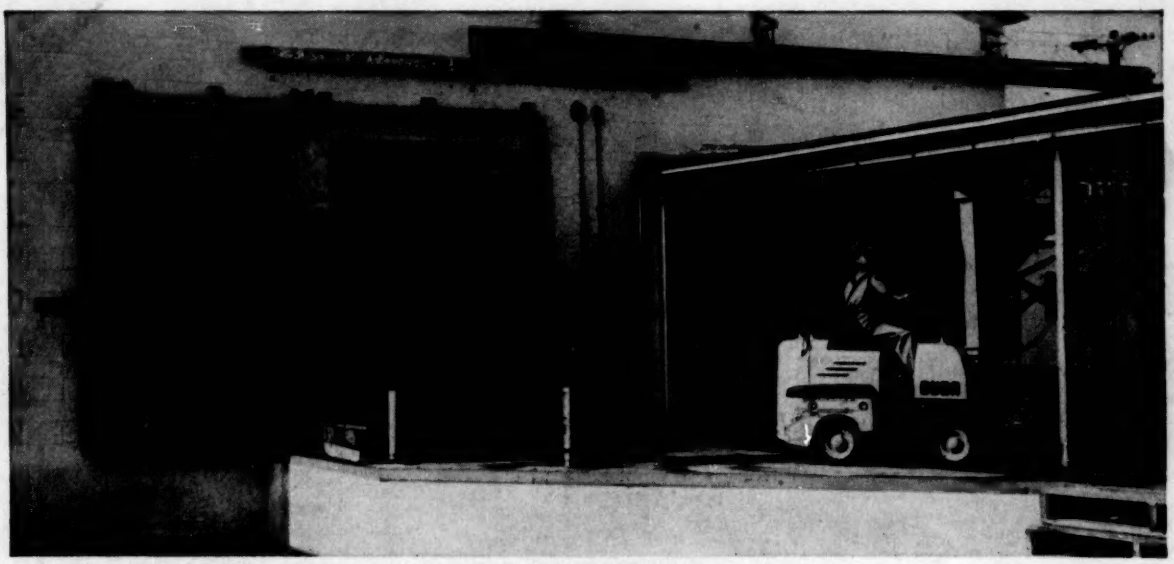
- ☐ "Insulation for Low Temperature Structures and Equipment"
- ☐ "PF Design Details"
- ☐ "Why the Trend is to Fiberglas"

Name and Title_____

Company_____

Street_____

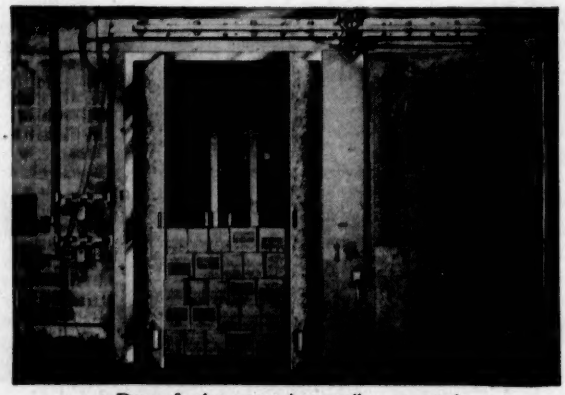
City_____ **Zone**_____ **State**_____



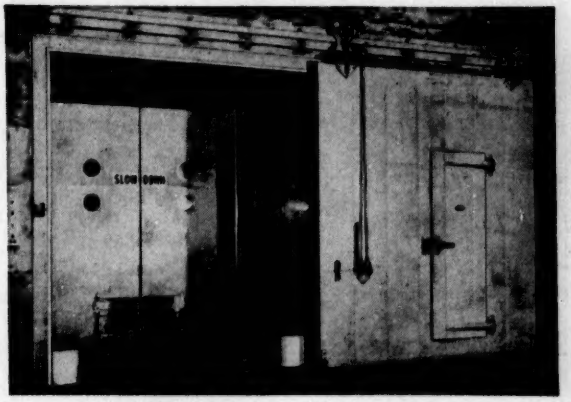
No wasted platform space

Jamison Horizontal Sliding Cold Storage Doors

- conserve floor space
- give tight seal
- permit power operation



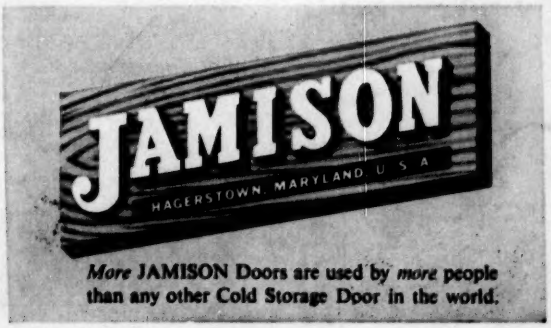
Doors for large openings easily supported



Wicket door for personnel passage

Equipped for power operation with remote control

For help on any cold storage door problem, consult your architect or write to JAMISON COLD STORAGE DOOR CO., HAGERSTOWN, MD., U.S.A.



More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.